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A COMPARATIVE STUDY OF SELECTED READING
AND LISTENING PROCESSES

by



LAURENCE WALKER

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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THE UNIVERSITY OF ALBERTA
FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies and Research
for acceptance, a thesis entitled A Comparative Study of
Selected Reading and Listening Processes submitted by
Laurence Walker in partial fulfilment of the requirements
for the degree of Doctor of Philosophy.

H. D. Jenkins
.....
Supervisor

H. Maguire
.....

Archie Kay
.....

D. M. Oetridge
.....

B. K. Jackson
.....

Jan. Johnston
.....

Mr. James S.
.....

Robert D. Armstrong
.....
External Examiner

Date *Dec 12, 1972*

ABSTRACT

Definitions of the reading process fail to indicate what its unique attributes are. While the reception and interpretation of linguistic messages in written form is exclusively the domain of reading, the latter is not clearly distinguishable from listening with respect to those processes which lie beyond the decoding stages of reading. This study set out to compare the processes of reading with those of listening to spontaneous speech in an attempt to illuminate some of reading's unique characteristics.

A preliminary pilot study was carried out comparing spontaneous speech and formal writing. Analysis of the samples collected from articulate grade eleven students showed that their spontaneous speech was characterized by the presence of extraneous material, a higher proportion of sentences judged by a panel to be linguistically deviant, and poorer rhetorical structure. These findings led to a refinement of the research question. It then asked whether, considering the differences between the two language inputs to the processes, reading involved greater precision of reconstructive interpretation than listening.

The answer to this question was sought by means of a written recall task following reading or listening. Three separate samples of grade eleven students, each of approximately forty-eight subjects, were randomly divided into listening and reading treatment groups. Following exposure to an oral or written version of one of three

stimulus passages, both groups attempted to reproduce in writing the ideas presented. These recall texts were analyzed using a set of post hoc categories relating to aspects of the recall of explicit original ideas and the phenomenon of importation.

Two-way analysis of variance revealed differences between the treatment groups. The reading groups produced significantly more of the explicit original ideas. This superior performance was also observed for the recall of explicit original ideas expressed in a way which indicated the relationship of the idea to the overall discussion and in a form which did not distort the original meaning. Also the recalls of the reading groups contained a significantly smaller proportion of importation.

Using a rationale based upon Ausubel's Subsumption Theory, the differences were accounted for by the argument that the interpretations which the readers had achieved were more precise, being tightly disciplined by the clearer constraints of formal writing. Those achieved by the listeners, given the looser constraints of spontaneous speech, displayed more variability and less fidelity to the explicitly stated ideas presented by the speakers.

Because of the perspective and design of the study, the differences revealed were relative rather than absolute and so they could not indicate characteristics that were unique to reading. However, it was claimed that these tentative findings suggested one area in which differences of degree between reading formal writing and listening to spontaneous speech might lie.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Introduction

The essays we have reviewed focus on problems that are not specific to reading but common to the processing of both speech and text . . . and so reading research is no longer an isolated field; indeed its bounds have become a little difficult to define (Brown, 1971, p. 183).

Brown's reaction to a collection of recent research reports on the reading process points to a problem which besets reading as an area of scientific enquiry. The lines of demarcation which separate it from other subjects of investigation are unclear. Kingston (1971) referred to the problem when he wrote:

. . . in the last two or three decades reading behaviour seems to have expanded to include many human functions. It would be interesting to see models built on more restrictive parameters (p. 8-63).

The exact domain of reading is not a problem to which writers and research workers within the field have often addressed themselves. Reading comprehension, for example, has been the subject of a huge body of literature which has sought to identify and evaluate the skill components involved in the understanding of written language. The resulting lists and taxonomies of reading skills are frequently similar to lists and taxonomies that are the outcomes of research into listening comprehension. This apparent similarity of identity raises the question of how far reading and listening are uniquely separate activities other than in terms of their obvious, overt

differences. If they are not uniquely separate, then there would seem to be some justification for treating them as a single activity, language processing. Jenkinson (1970) listed as a major research topic "the nature of verbal understanding with particular reference to the differences between spoken and written discourse (p. 182)." This she called an information gap.

The language arts are said to consist of the expressive skills of speaking and writing and the receptive skills of listening and reading. Both of the receptive skills could, therefore, be considered as members of a single class, the reception of information through language, or the processing of language. In certain obvious respects the two are readily distinguishable: one is the processing of spoken language received temporally through the auditory channel, while the other is the processing of spatially displayed written language through the visual channel. In these respects reading is a unique type of language processing; this part of its domain is clearly defined. However, the question of other unique attributes, other distinguishing characteristics that set it off from listening, is harder to answer. Much of the research under the rubric of reading comprehension seems to be predicated on the assumption that the higher level interpretive processes of reading are also unique. In other words, it assumes that reading comprehension is different from other kinds of comprehension and, therefore, worthy of study as a behaviour in its own right.

This assumption, as it applies to the teaching of reading, has been challenged. Moffett (1968) wrote:

A child who fails to understand a text either cannot decode letters or else cannot understand the text for reasons having nothing to do with printed words; he could not understand even if the text were read aloud to him. In other words reading comprehension is merely comprehension (p. 16).

Moffett's position was a more extreme version of the linguistic view of reading as a two-stage process: the first being the "construction or reconstruction of a spoken message or of some internal representation of it" and the second "the comprehension of messages so reconstructed (Carroll, 1964, p. 338)."

In the linguistic view, the domain of reading would seem to be confined to the decoding aspects of processing written language, the reconstruction of the oral counterpart to the written message. At the other extreme is the broad conception of reading advocated by, for example, Gates (1949) when he wrote: "It (reading) can and should embrace all types of thinking, evaluating, judging, imagining, reasoning, and problem solving (p. 3)."

Between these two pole positions, innumerable definitions of reading can be found. This diversity of definition leaves the domain of reading something of a question of choice and this is often reflected in reading research. As Otto (1970) wrote: "Up to the present, then, the study of reading behaviour is confounded by the lack of agreement as to what reading is (p. 228)."

Sometimes, if the attributes of an object or activity are obscure, it can be understood in terms of how it differs from other similar entities. Perhaps this might be one approach to a better understanding of the reading process. By taking reading and listening as the two chief, if not sole, members of the class of language

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processing behaviours, they could be compared and contrasted to see in what ways they differ. In this way the nature of reading could be illuminated in terms of how it is different from one kind of listening. The present study set out to achieve such a comparison.

Purpose of the Study

The purpose of this study was to compare and contrast reading and listening as language processing behaviours in order to clarify some of the unique characteristics of reading. The targets of the study were the processes of reading and listening as manifested in the performance of relatively mature subjects. Moreover, reading was compared with listening to spontaneous spoken language, not with listening to the oral reading of written language.

Overview of the Design of the Study

The study consisted of a comparison between the processes involved in listening to spontaneous speech and those involved in reading formal writing. The comparison was made from a perspective which regarded listening and reading as two types of language processing. The processing of both spoken and written language was seen as involving two human information processing principles, cue selection and message reconstruction.

The operation of these two principles in listeners and readers was observed indirectly using a written recall technique. The differences observed between the written recalls of groups of listeners and those of groups of readers were used as the basis for inferential

arguments addressing the research question relating to differences between the covert processes of listening and reading.

The written recall data were obtained from three independent samples of approximately forty-eight grade eleven students. They were randomly assigned to two treatment groups and, on the basis of test scores, allocated to three reading levels and three listening levels. They were presented with either a written or a spoken version of one of three discussion passages. Following reading or listening, they wrote down all they could recall from the discussion. These written recalls were used as the source of data for the comparison between listening and reading. A set of categories was developed by which to analyze the recall texts according to meaningful characteristics. The data derived from this analysis were statistically tested to reveal whether the treatments had resulted in any significant effects upon the recall texts. These statistical procedures were supplemented by an informal analysis of the differential recall of certain individual ideas from the original discussions.

The hypotheses which motivated the statistical tests did not directly address the research question. They referred to the differences between the recall texts. On the basis of these findings it was necessary to build an inferential argument to account for any differences revealed between the two sets of recalls. It was this argument which addressed itself to the research question and to the differences between the processes of listening and reading.

Definition of Terms

The study required the use of several technical terms and the coining of others with which to label certain phenomena in the different analyses. Those terms which were specific to the analysis of the written recall texts were not included in this list of definitions. They are discussed and summarized in Chapter IV.

Discourse was meaningful, connected language text, either written or spoken.

Assertive Discourse was text predominantly composed of sentences or propositions that were either true or false. Assertive discourse was classified as either exposition or argument.

Argument was assertive discourse that consisted predominantly of assertions that were intended as reasons for believing the truth or falsity of other assertions. A discourse classified as argument consisted of a network of interrelated assertions supporting one or more general assertions.

Spoken Language referred to thought encoded into the acoustic manifestation of language. It included oral reading, recitation, monologue, conversation and discussion.

Written Language referred to thought encoded into the graphic manifestation of language. It included handwriting and print.

Spontaneous Spoken Language referred to a subcategory of spoken language. Spoken language that was spontaneous occurred when a speaker encoded his thoughts into speech without reading aloud or having memorized his text. Thus, spontaneous spoken language included the

language of conversation, discussion and extemporaneous talks, either delivered with little or no advance preparation, or prepared with regard to content but not read or memorized word for word.

Formal Written Language was writing that was edited and revised before its final presentation.

Language Register was a term adopted from Halliday, McIntosh and Strevens (1964). It referred to a particular variety of spoken or written language distinguished according to use. A register was defined by its source (speaker or writer), user-medium relationship, mode and medium.

User-Medium Relationship was a term adopted from Gregory (1967). It referred to the relationship between a writer or speaker and the format used in his language production. Spontaneous speech involved one kind of user-medium relationship, oral reading another and so on.

Mode was the classification of a body of discourse according to exposition, argument, narration or description.

Language Processing was the reception and interpretation of linguistic material.

Stimulus Materials were the three discussion passages presented as listening and reading materials to the samples.

Discussion Passage was not a concrete entity. A discussion passage was merely an abstraction until it was manifested as either an oral or a written version. The term was used in order to indicate that an oral version and its written equivalent had a common conceptual base in the sense that they were intended to convey essentially the

same information.

Oral Version of a Discussion Passage was the extemporaneous discussion between two articulate grade eleven students recorded on videotape.

Written Version of a Discussion Passage was the formal written version prepared by the investigator from the oral discussion. It was presented in a question and answer format.

Linguistic Deviance was a term adopted from Butters (1967). It referred to abnormality in a sentence. There were three sub-categories of deviance: syntactic, semantic and operative.

Syntactic Deviance was the abnormality which resulted from the grammatical structure of a sentence failing to conform to that of conventional, acceptable usage.

Semantic Deviance was the abnormality which resulted from the use within a sentence of inappropriate or anomalous words.

Operative Deviance was the abnormality which resulted when a sentence was excessively long or complex, making it difficult to understand.

Written Recall Text was a subject's attempt to write down what he remembered of the version of the discussion passage he was exposed to.

The Development of the Research Question

A major theme of this research report was the progressive refinement of the question which directed it. At the outset, it was stated in very general terms which reflected, in a sense, the absence

of an empirical base from previous research. It asked:

Are there any differences between the processes of listening to spontaneous speech and reading formal writing?

Following the review of the literature of language processing, including reading and listening, and the development of a theoretical perspective from which to view process, the question was refined to ask:

Considered as processes involving cue selection and message reconstruction, are there any differences between listening to spontaneous speech and reading formal writing?

The comparison between the language of spontaneous speech and that of formal writing in the major pilot study led to a clearer understanding of how the two linguistic inputs to the processes were different. From this developed a further refinement of the question. It then asked:

Considered as a process involving cue selection and message reconstruction, does reading formal writing differ from listening to spontaneous speech in that it demands a greater precision and exactness of reconstruction?

This was the final form of the question, considered within the design delimitations of the study. The logical argument attempting to account for the differences between the two sets of written recall texts was addressed to the question in this form.

Significance of the Study

The study was intended to illuminate the question of whether listening and reading vary in ways other than their overt, physical activity. If differences could be detected between the way relatively mature listeners and readers process spoken and written language

respectively, this would indicate distinctive characteristics of the reading process. In other words, it would help to define the domain of reading.

The significance of the study was theoretical rather than practical. It was designed to add, in a very small measure, to what is known about the reading process as it operates in relatively mature subjects. However, an improved knowledge of a theoretical process would be expected, ultimately at least, to accrue benefits to the practical world of reading programs. The better the process of reading is understood, the better can be the teaching and materials that are designed to develop it.

Limitations of the Study

The following limitations were inherent in the study:

1. The subjects who composed the samples were drawn from one grade level only, grade eleven. Moreover, they were all urban students from schools serving lower and middle class socio-economic areas of one Western Canadian city.

2. From the great diversity of input that constitutes a person's language environment, a very narrow selection was made to achieve some homogeneity of materials. One mode of discourse, argument, was used. The source was articulate grade eleven students for the oral and the investigator himself for the written versions of the materials. Only spontaneous discussion was involved as the format of the spoken versions. Generalization of the findings could only be made within the confines of these register parameters.

3. A further limitation was inherent in the study. Students typically receive considerable direct instruction in reading in the course of their school careers. Listening as a set of skills is given relatively less emphasis. This difference, beyond the control of the study, might have affected the degree of rigour in the subjects' processing of the messages in the oral and written stimulus materials.

Assumptions of the Study

The logic of the study rested upon certain assumptions:

1. It was assumed that spontaneous peer group discussion formed a significant part of the language environment of adolescents and that, as such, its processing was a legitimate target of study.

2. The concept of language registers, serving to emphasize the fragmentation of language into a multitude of varieties, implied the assumption that any particular samples of language studied did possess generalizable features that influenced their processing. It was assumed that these generalizable features were not outweighed by idiosyncratic elements peculiar only to the particular speakers or writers involved. Ultimately each person in each language producing situation could be responsible for a unique register. This study did not attempt to control for this by random selection of language samples. Only three pairs of grade eleven students were involved in the production of the oral samples, while the investigator himself was responsible for the written ones.

3. Spontaneous oral discussion is encountered relatively frequently. While certain magazines use a written question and answer format to

present interviews, written discussion as such is relatively rare. It was assumed that this particular format of writing did not impose a different processing strategy upon the readers than the one they commonly utilized in the reception and interpretation of written language.

Plan of the Investigation

The chapter which follows attempts to develop a theoretical perspective from which to compare listening and reading processes. It also includes a discussion of the rationale for the validity of a written recall technique to produce data that could be used as the source of the comparison. Chapter III gives an account of a preliminary major pilot study whose purpose was to compare certain characteristics of spontaneous speech and formal writing in language registers that were closely equivalent to those employed in the study itself. Following this, the design of the study is described and explained in Chapter IV. In the following chapter, Chapter V, the significant and non-significant differences between the recall texts of the groups of listeners and readers are presented. The differences described in Chapter V do not directly address the research question since they refer to the written recall texts not to the processes of listening and reading which produced them. Chapter VI presents the tentative findings from an informal analysis of the differential recall of selected original ideas from the discussion passages. This informal analysis was undertaken in an attempt to observe the effects on recall and processing by listeners of the variables identified by the major

pilot study as distinguishing spontaneous speech from formal writing. The final chapter, Chapter VII, draws conclusions from the findings of the two previous chapters by relating them to the research question by means of an inferential argument accounting for the observed differences in the light of the theoretical perspective of the study.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The purpose of this review of the literature is first to provide a setting for the study in the light of other research into the differences between reading and listening. A second aim is to develop a theoretical perspective within which to consider the processes involved in the two activities. Within this perspective the similarities and differences between the two will be considered and an attempt will be made to refine the general research question motivating the study. Finally, the review will present a rationale for the assessment of the processes underlying reading and listening through the use of a reproductive technique.

Comparative Studies of Listening and Reading

Comparative studies of reading and listening have been reviewed by Duker (1968), Spearritt (1962) and Jester (1966). Duker (1971) stated that his bibliography on the subject of listening had included approximately 200 entries on its interrelationships with reading. One theme of this large body of research has been to assess the extent of the relationship between the two receptive language arts. Coefficients of correlation between scores on standardized tests have revealed correlations usually ranging between .25 and .80 (Jester, 1966,

p. 6). Spearritt's (1962) survey of the literature revealed a typical range of .5 to .6 for upper elementary school subjects, a somewhat higher range for high school subjects, and more variability in college level studies (p. 12).

A second theme of this comparative research has been the relative effectiveness of listening and reading as receptive channels of communication. Research has shown that several factors have to be taken into account in this comparison.

Age appears to be an important factor. Up to about grade six or seven listening appears to be the more effective channel; beyond that the results are more variable (Spearritt, 1962, p. 13). Another variable seems to be academic achievement, reading being a better channel for high ability students and listening for low ability ones. A third factor is the difficulty of the material involved. In an early study Carver (1935) found that reading was superior to listening only in cases where the material was difficult. Otherwise, for easy material, comprehension was better after listening.

Some research has been carried out to determine whether performance in one medium as measured by a comprehension test is amenable to improvement through instruction in the other. Duker (1971) listed eleven such studies which produced variable results, in some cases instruction in listening resulting in improved reading performance, in others no improvement being revealed (p. 72).

Finally, another theme, within the area of listening which pertains to its relationship with reading is the question of whether listening exists as a separate skill, or cluster of skills, from other

verbal skills. Spearritt (1962) carried out a factor analysis study in which a battery of thirty-four tests was administered to a final sample of 300 grade six students in Australia. He found that a definite listening comprehension factor was identified, described more exactly as "comprehension of verbal material presented in spoken form (p. 92)." This factor was "clearly both confined to and common to the experimental tests of listening comprehension (p. 79)." A similar finding was reported from the results of smaller factor analysis studies using high school students by Caffrey (1955) and Caffrey and Smith (1956, in Spearritt, 1962, p. 14).

Duker (1964) used the evidence from these factor analytic studies as the basis for the assertion that there was no doubt that a quality referred to as listening comprehension could be identified and isolated (p. 246). In rebuttal, Petrie (1964) claimed that "we do not know how to isolate and measure listening ability validly and reliably (p. 249)." Kelly (1967) was sceptical about the confidence which could be placed in Spearritt's (1962) finding. He pointed out that all the listening tests used in the study were modified for the experiment, and that the common factor identified could have been caused by the common method of administering these tests, namely by means of tape recording (p. 462).

The main body of comparative research into the relationships between listening and reading has concentrated upon one type of listening material, written language that is read aloud. Linquist (1959), in a review of the Brown-Carlson Listening Comprehension Test and the Sequential Tests of Educational Progress Listening Test,

commented that there was no evidence that these tests measured anything different from a silent reading test (p. 577). These two tests are the most widely used measures of listening in this type of comparative research.

The work of Halliday, McIntosh and Stevens (1964), Gregory (1967) and Wilkinson (1969, 1970a, 1970b, 1971) has drawn attention to the fact that language, other than in its abstract form as a system of rules, is not a single phenomenon. Language varies with the situation, subject and people involved in the production of any particular utterance. The term "language register" has come to be used to refer to a particular variety of language defined by parameters such as medium, situation, subject, and relationships among the participants. Thus, limiting the testing of listening ability to language that is read aloud samples only a small part of the total language registers which people are normally exposed to as listeners. Moreover, language that is read aloud is, in many cases, quite similar to normal written language so that a relatively high correlation between the two receptive activities, listening and reading, could be attributed to this common type of input.

In the study by Spearritt (1962), referred to above, one of the listening tests used consisted of children's spontaneous conversation. Wilkinson (1969, 1970, 1971) has been a strong advocate of the need to extend the study of listening to registers other than material read aloud. He reported (1969) that attempts were being made at the University of Birmingham to produce a listening test consisting of spontaneous spoken material (p. 51). This was an attempt

to introduce into the field of listening testing what Wilkinson (1970b) called "living information (p. 77)."

Apart from Wilkinson's work, little research has been located by the present investigator which compared listening to spontaneous speech and reading. It would seem that one could expect to find a different relationship when listening involves this type of material than when reading and listening involve material that is similar in structure, style and organization.

A second characteristic of the comparative research into listening and reading has been the emphasis upon the skill composition of each as measured, usually, by standardized tests. This is true of the correlational studies, the transfer studies, the relative effectiveness studies, and the factor analytical studies. Reading and listening have been compared as skills, or clusters of skills.

Within reading as an area of study there has been an increasing emphasis upon the processes involved in reading. Brown (1970) wrote:

. . . there has been a growing realization by most reading investigators that a better theoretical understanding of the reading process itself is a virtual necessity before there can be any major advance in this area (p. 51).

This emphasis is especially discernible in the proliferation of theoretical models of the reading process based upon linguistic, psycholinguistic and information processing concepts (Geyer, 1971).

There would seem to be some value, as well as novelty, in extending this emphasis upon process to a comparative study of listening and reading in an attempt to investigate the processes of each. By the term, "process", is meant the mental activity in which a person

engages while receiving and interpreting spoken language in the case of listening and written language in the case of reading. The question underlying process-oriented research would be, how does a person listen and how does a person read? Specifically in the case of this present study the question would be, do people process spontaneous spoken language in a different way than they process written language?

The Processes of Listening and Reading

The processes of reading and listening, like any other mental activity, are covert and not amenable to direct observation and measurement. Ultimately these processes reside in the domain of neurology and biochemistry and refer to the firing of neural mechanisms and the transfer of energy within the nervous system. Cognitive psychology attempts to portray this level of process on the psychological plane by building models made up of constructs and relationships that are artificial rather than real. To talk of listening processes and reading processes is to speak of the psychological correlates of neurological mechanisms. Listening and reading processes are those correlates which describe the apparent operations engaged in by the organism seeking to obtain information from speech and from writing.

Within the field of reading research there have been several attempts to study process. Huey (1908) reported a study in which he compared the introspective meaning associations of readers faced with isolated words and readers faced with the same words in continuous text. Thorndike (1917) inferred some of the reasoning processes of reading from a study of the errors made by children in answering

open-ended questions after reading a paragraph of text. Harris (1948) studied comprehension of literary material in terms of the processes involved by means of factor analysis.

A series of doctoral studies at the University of Chicago studied various aspects of the processes of reading using introspective and retrospective techniques. Piekarz (1954) studied the interpretive responses of grade six students obtained retrospectively after the silent reading of a passage. She used an a priori set of categories based on Gray's model of reading to analyze the responses. Jenkinson (1957) studied selected processes related to reading using the cloze procedure and the introspective verbalizations of high school students recorded while they were carrying out the cloze test. Other studies in this series included those of Swain (1953), Letton (1958), Rogers (1960) and, several years later, Fareed's (1971) study.

Simons (1971), in a critical review of research into reading comprehension, stated that knowledge of the processes involved in it has advanced little since the publication of Thorndike's study in 1917. He attributed this failure to the absence of a theory within which to study them (p. 340). Perhaps his first point was overstated; but the truth remains that research in reading has failed to achieve a coherent, concerted attack upon the problem of the underlying processes of the activity. Perhaps the absence of a theoretical position has been the reason, resulting in a failure to develop a common ground from which to hypothesize, test and confirm or disconfirm.

It was imperative, therefore, that a study which claimed as its target the processes of reading and listening should attempt to develop

a theoretical framework which would explicate the processes as they related to the purpose of the study. This theoretical framework would also be a source of hypotheses about the differences, if any, between the two processes and would also be capable of accounting for any differences which were empirically revealed.

It was unlikely that such a theory could have been derived from reading and listening research per se. The process-oriented research in reading has been somewhat fragmentary and in listening research process appeared to have received little emphasis. Thus, the theory had to be derived from elsewhere. One source was that branch of cognitive psychology which attempts to account for the mechanisms and processes by which the human organism receives, processes and stores sensory information from his environment, human information processing.

Many aspects of this field are extremely detailed and specific in their attempts to isolate components of the processing system and its operation, and highly complex models have been evolved (Sperling, 1970; Norman and Rumelhart, 1970; Biggs, 1969; and Mackworth, 1971). These models are partly attempts to account for the findings of laboratory-type research studies and partly sources of hypotheses. The attempts to be specific have been attended by controversies, and, for this reason, human information processing did not seem capable, at this time, of providing a comprehensive, field-tested theory which could be applied confidently to listening and reading. However, there did appear to be certain more general concepts of information processing that enjoyed a consensus of support and which could be applied to the

area of the present study. Two such concepts, or principles, that illuminate aspects of the processes of listening and reading were derived. While it was not claimed that these provided anything like a complete theoretical framework, they did provide a basis from which to study certain aspects of reading and listening, aspects which would be revealed to some extent by the design of this study.

The Principles of Cue Selection and Message Reconstruction

Implicit or explicit in models of human information processing (Sperling, 1970; Norman and Rumelhart, 1970; Biggs, 1969) is the principle that the organism does not receive and process all the sensory information that assails him. Even within a single set of sensory input being attended to the total information contained in it is not utilized in its processing. This principle can be called cue selectivity, or cue sampling.

Closely associated with cue sampling, is the second principle, that information processing is constructive, or reconstructive, a matter of recreating, from the partial information received and processed, the whole event concerned. It is not simply the passive reception of information to be filed away. Neisser (1967), writing of cognition generally, saw it as "referring to all the processes by which sensory input is transformed, reduced, elaborated, stored, recovered and used (p. 4)." He compared the reconstructive nature of cognition to the activity of the paleontologist who, through the use of a few bone chips, is able to reconstruct a model of a prehistoric dinosaur

(p. 94). Bruner (1957) was referring to the same principle when he wrote about the ability of the perceiver to go "beyond the information given." He used as an example the ability of a person to identify a distant ship at sea on the basis of a "speck on the horizon surmounted by a plume of smoke (p. 42)."

Both of these principles have been applied to the processing of spoken and written language. Indeed, language in one of these forms has frequently been the source of stimuli for use in experiments which have sought to study aspects of these cognitive processing principles.

The Application of the Principles of Selection and Reconstruction to the Processing of Spoken Language

Both of these principles form an integral part of the theory of analysis-by-synthesis proposed by Halle and Stevens (1959) as a model of speech perception. The theory is an analysis of the processes by which the stream of acoustic signals is decoded and recognized as speech.

The model postulated a two-step process (Halle and Stevens, 1964). The first step consists of a preliminary analysis of the signal and the identification of parts of the input, perhaps phonemes. On the basis of the initial identification of these elements, an hypothesis is made about the abstract representation of the utterance, that is the underlying base form which Chomsky and Halle (1968) referred to as consisting of a set of distinctive features (p. 12). This abstract representation is then operated on by the phonological rules to yield a pattern or sequence of phonemes corresponding to the surface structure of an utterance. In speech production this would lead to a set of motor

commands to produce articulatory activity and speech; but in speech perception this motor activity is blocked and an auditory pattern is produced. This auditory pattern is compared with the pattern under analysis from the acoustic input by the selection of other cues from the signal. If a match occurs, the pattern is read out for processing at higher levels. If a mismatch occurs, another pattern would be generated. The likelihood of a guess, or hypothesis, being correct is enhanced by the context of previous processing and any factor "which predisposes the listener to synthesize one utterance rather than another (Neisser, 1967, p. 196)."

This analysis-by-synthesis theory of speech perception asserted that what is heard is what the listener believes or thinks was said. Speech is not the sound which reaches our ears; speech is what has been encoded into a stream of acoustic signals by articulatory activity on the part of the speaker, and speech perception is a matter of decoding from this acoustic stream. Analysis-by-synthesis states that fragments of speech-distinctive features, or phonemes--are identified and then, on the basis of the listener's knowledge of the phonological structure of the language, these fragments are used as the basis for constructing an hypothesized speech pattern which is checked against further fragments sampled from the input for compatibility. In this way what is heard is what the listener reconstructs under the prime control of the input information but also strongly influenced by his expectations based on previous context and whatever motivational and other factors are operating.

Analysis-by-synthesis as a theoretical account of speech

perception has been supported by Hochberg (1970) and by Neisser (1967). Hochberg (1970) claimed that the theory could accommodate the findings of studies of dichotic listening in which a listener is able to select one of two speech inputs for attention and processing, filtering out the second. For Hochberg (1970) attention was built into the perceptual process and defined by the steps of analysis-by-synthesis. He wrote:

When the listener receives a phoneme in a voice to which he selects a plan to produce some well-practiced fragment of speech that starts with the phoneme just received. . . . He listens for the later occurrence of one or two distinctive phonemes in the speech fragments. If he actually receives what he anticipates, he goes on to anticipate the next speech fragment. Thus, it is the expectations that are being tested rather than the entire sequence of phonemes that were presented (p. 220).

The need for such a selective theory of speech perception is demonstrated by the rate at which spoken language can be understood. Liberman, Cooper, Shankweiler and Studdert-Kennedy (1967) stated that speech can be understood up to a rate of approximately 400 words per minute. At this rate they estimated that the ear receives thirty phonemes per second, well beyond its temporal resolving power. "Discrete acoustic events at this rate would sound like a buzz (p. 432)." Analysis-by-synthesis could account for the possibility of speech processing at this speed on the basis of selective sampling of the acoustic input and the synthesis, or reconstruction of the speech pattern by hypothesis and the application of phonological rules.

The theory can also account for the fact that people can often manage to hear words that were not in the input at all (Neisser, 1967, p. 196). It is also compatible with studies of speech perception under adverse condition. Neisser (1967) referred to an experiment by Miller,

Heise and Lichten (1951) in which it was found that the perception of sentences was possible under conditions of noise that rendered nonsense syllables impossible to perceive and individual words difficult.

Experiments like this suggest that context plays a vital role in the formation of hypotheses based on sampling of cues. The individual units in a meaningful sentence context require fewer cues for their identification than units in isolation.

Halle and Stevens (1959, 1964) developed their model for application to speech perception at the level of phonemes and distinctive features of phonemes which constitute words. It seems that the same principles of construction and selection can be applied to higher levels of auditory language reception. The synthesis of a pattern of phonemes from received fragments proceeds on the basis of the listener's knowledge of the phonological rules of the language. At the phrase and sentence level another system of language rules, the syntactic, offers the possibility that a similar process of selection and constructive synthesis could be working in the processing of these larger language units. There may be a grammatical synthesis as well as a phonological synthesis.

Neisser (1967) proposed that the analysis-by-synthesis model could be extended to the processing of sentences. According to Neisser's (1967) extension, the listener perceives cues to the surface structure of the sentence, "perhaps the most obvious ones being the so-called function words (p. 259)," and on the basis of these cues formulates a series of structures which are integrated into the overall sentence. The rules of grammar governing sequences of words

and phrases serve to make predictions, or hypotheses, feasible.

Further sampling of cues confirms or disconfirms the hypothesis.

Evidence in support of the theory's validity at this level of processing is obtained from the results of experiments requiring subjects to recall various kinds of linguistic strings. Nonsense words are easier to recall when they are presented in an order which approximates English syntax (Epstein, 1961, 1962). Higher-order, word-by-word approximations are also easier to recall than lower-order ones which have less syntactic similarity to everyday English (quoted in Neisser, 1967, p. 263).

Chomsky and Halle (1968), in their theoretical work on English phonology, accepted the analysis-by-synthesis theory of speech perception. They wrote:

The hearer makes use of certain cues and expectancies to determine the syntactic structure and semantic content of an utterance. Given a hypothesis as to its syntactic structure--in particular its surface structure--he uses the phonological principles he controls to determine a phonetic shape. The hypothesis will be accepted if it is not too radically at variance with the acoustic material, where the range of discrepancy may vary widely with conditions and many individual factors. Given acceptance of such a hypothesis, what the hearer hears is what is internally generated by the rules (p. 24).

It seems that the principles of cue selection and message reconstruction are satisfactory explanations of aspects of the receptive phases of the listening process. Listening in speech can be characterized as a process of attention to and selection of partial auditory input and, on the basis of this, reconstructing the message using knowledge of the phonology and syntax of the language together with knowledge of the context and the topic as essential sources of information.

The Application of the Principles of Selection and Reconstruction to the Processing of Written Language

A considerable body of recent literature on reading has emphasized the processing principles of selection and construction (Goodman, 1970; Smith, 1971; Kolers, 1970; Ryan and Semmel, 1969; Brown, 1970). The role of language has been given a central position and the reader's knowledge of the language system has been seen as one of the most important components of the process.

Goodman (1970) set out to refute what he called the "common sense notion" that:

Reading is a precise process. It involves exact, detailed, sequential perception and identification of letters, words, spelling patterns and large language units (p. 259).

In place of this misconception he offered an explanation of the process that was summed up in the title of his article, Reading: A Psycho-linguistic Guessing Game. This explanation, fully stated, was that:

Reading is a selective process. It involves partial use of available minimal language cues selected from perceptual input on the basis of the reader's expectation. As this partial information is processed, tentative decisions are made to be confirmed, rejected or refined as reading progresses (p. 260).

Goodman's view of reading was derived from the results of his research into the oral reading errors of young children. These errors he called "miscues." He observed that children would substitute words when they were reading aloud, but that often these substitutions were either syntactically or semantically acceptable in the sense that they did not destroy the grammar or the meaning of the text. Goodman argued that these miscues did not represent perceptual errors. Rather, the

information that was being used in reading was not solely graphic; the reader was using syntactic and semantic information to predict what was written.

This view of reading fits in perfectly well with the analysis-by-synthesis theory of Neisser (1967) and Hochberg (1970). It accounts for the data from studies of oral reading miscues and it also offers an explanation of the speed reading phenomenon. Reading speeds in excess of 600 words per minute can be explained on the basis of a cue-sampling theory as a high speed prediction process, using a bare minimum of graphic cues and a high degree of semantic redundancy.

Smith (1971) has developed a view of the reading process drawing on the concepts of information theory rather than information processing. As an account of the active, constructive and selective processes involved in reading, this view is compatible in many ways with that of Goodman discussed above.

According to Smith (1971), the acquisition of information from written material is a matter of uncertainty reduction, or a function of the number of alternatives that are eliminated by the content of the message. This uncertainty reduction operates at different levels in the reception of written messages. Smith (1971) identified three levels: letter identification, word identification and reading for comprehension (p. 18). Visual information is received that reduces the uncertainty as to which letters are involved, which words are used and which meanings are intended.

The argument is then developed by a discussion of another

information theory concept, redundancy. This can be defined as the elimination of the same alternatives in more than one way. Redundancy can be found at several levels in the English language. Smith (1971) discussed two types: distributional and sequential redundancy. The first is associated with the "relative number of times each of the alternatives that constitute the uncertainty of a particular situation can occur (p. 21)." With respect to the alphabet, letters like "e" "t" "a" "o" "i" "n" "s" occur far more frequently than others. With respect to the lexicon of English, there are many words which recur over and over again in any sample of writing. A person who possesses this intuitive knowledge of the distributional redundancy of language and who brings it to the reading situation contributes information to the task. The uncertainty which has to be reduced in order for him to receive the message is less than it would be if the language system was composed of letters and words each of which had the same probability of occurrence.

Sequential redundancy refers to the collocational restraints built into English orthography and syntax. For example, when one encounters the letter "h" in a word, it is almost certain to be followed by a vowel and never by letters like "g", "z", "j", or "k". The same principle applies to the sequence of words in English; some patterns are not allowable and are therefore not alternatives that the receiver of a linguistic message has to consider. These collocational rules are part of the internalized linguistic competence of the mature reader, and again represent information, in the uncertainty reduction sense, which he brings to the reading act.

Smith (1971) applied the same two information theory concepts, reduction of uncertainty and redundancy, to the acquisition of meaning (ch. 13). He wrote that:

. . . comprehension is the reduction of uncertainty through the elimination of alternatives by the allocation of a statement to a particular cognitive structure (p. 192).

The reader is a person who brings a highly structured knowledge of the world to the reading situation. He has an internalized model of reality. Thus, the meanings that he expects to derive from the reading situation are not random; he expects them to be logical and capable of being assimilated to his model with some accommodations on his part depending on the difficulty or unpredictability of the content of the reading. The logical arrangement of the material gives it predictability. It has been derived from a model of reality possessed by the writer which probably would have a high degree of congruence with that of the reader--albeit perhaps more refined in the area of the topic of the writing. This constitutes a kind of semantic redundancy. Not all meaning alternatives are equally probable. The context as well as the logic of the topic restricts these alternatives, facilitating the reduction of uncertainty or the reception of information about the meaning intended.

Although developed within a different framework, Smith's view of mature reading is very similar to Goodman's concept of the "Psycholinguistic Guessing Game." Like Goodman, Smith was concerned with rebutting the notion that reading is a matter of precise perceptions and identifications of visual information from the graphic array. Instead, reading is highly selective as far as the utilization

of visual information is concerned. Reading involves other information--the reader's background information, his knowledge of the orthographic and syntactic restraints of the language--which he brings to bear on the task of reducing his uncertainty about the message, or of receiving information from it. Whereas Goodman stressed the hypothesis--testing aspect of this visual sampling, Smith saw the process as one of choosing among alternatives. However, these different emphases would appear to be perfectly compatible. The hypothesis, or the guess, represents a tentative reduction of uncertainty by the provisional choice of an alternative to be confirmed or disconfirmed by additional visual cues.

Reduction of uncertainty was also the explanation for the constructive and selective nature of the reading process given by Anisfeld (1966). He considered reading as a "hierarchical process of eliminating uncertainty (p. 50)." The reader utilized only enough graphic information in the identification of a unit to reduce the alternatives to which his knowledge of the structure and topic of the discourse restricted him.

Ryan and Semmel (1969) were closer to the Goodman position when they wrote:

Reading is an active process in which the reader forms and lists hypotheses about the information in the text rather than passively reacting to written forms unit by unit (p. 61).

They also stressed the constructive aspects and the use of efficient sampling strategies "based on the reader's knowledge of the language and of the reading situation (p. 61)."

The application of the two principles, selection and

reconstruction, was supported by the research findings of Project Literacy (Wanat, 1971, p. 8-163). This research effort studied the reading process within the framework of an analysis-by-synthesis model. Early studies using the cloze procedure established the relative predictability of certain grammatical patterns such as active and passive structures, left or right embeddedness, agent-included passives and agent-deleted passives. The analysis-by-synthesis argument was that the more predictable a structure, the less visual information would be required to process it; that an hypothesis could be established more quickly for a predictable structure than for an unpredictable one.

These structures were then used as stimulus materials in further experiments designed to test the effects of predictability on processing. Measurement of the eye-voice span, the distance the eye is ahead of the voice during oral reading, revealed that it was larger when the grammatical structure was more predictable (Wanat, 1971, p. 8-165). The presentation of the structures in varying degrees of visual clarity revealed that a lower level of clarity for phrase units could be tolerated by the reader when the context rendered them more predictable (in Wanat, 1971, p. 8-165). Another technique consisted of presenting subjects with pairs of sentences and asking them to indicate whether they were the same or different. Again success was related to predictability of structure. Finally eye-movement studies showed that sentences with a low structural predictability required more visual attention than those whose predictability was higher (in Wanat, 1971, p. 8-166).

The results of these research studies can be interpreted as showing that the reader makes use of his knowledge of the syntactic properties of language in processing written material. When he can reconstruct the message confidently in the case of a familiar pattern, less visual information is necessary to set up an hypothesis and confirm it.

Studies by Kolers (1970) provided additional evidence that reading was a process involving selection and construction. He found that the minimum exposure time required to identify each individual letter in a six-letter display presented tachistoscopically was one quarter of a second. Since English words have an average length of five or six letters, reading in which every letter was identified could proceed at a maximum rate of between thirty and forty words per minute. Given normal reading rates well in excess of this and rates of over 300 words per minute relatively common, every individual letter cannot be processed in normal reading. Words must be processed by a letter sampling procedure.

Using geometrically transformed text in oral reading situations, Kolers (1970) showed that grammatical information was used by readers. A high proportion of word substitutions were syntactically acceptable and syntactically acceptable substitutions were less likely to be corrected. Substitutions which were syntactically correct with respect to preceding context and which were then found to violate the structure of the sentence as revealed by subsequent words constituted eighty-eight per cent of corrected substitutions. This showed that an hypothesis about the identity of words could be set up on the basis of grammatical

information and could then be rejected on the basis of further similar information.

Finally, in a series of experiments with bilingual readers, Kolers (1970) showed that meanings could be perceived directly in reading without the necessary mediation of word recognition. Meaningful text made up of French and English phrases was presented and comprehension measured. It was found that performance was as good as when unilingual text was presented. When asked to read aloud quickly, subjects would often translate from one language to another indicating that meaning, not individual words, was being processed.

These studies show that at three levels reading is a constructive, cue sampling process: at the level of word identification letter information is selectively processed; at the phrase and sentence level grammatical information can override visual; and meaning can be processed without prior identification of individual words.

Wanat (1971), referring to reading as a process which utilizes less than the total visual information available, pointed to the results of a study by Pillsbury (1897) which found that readers did not always detect errors in the material they were reading, such as letter substitutions, transpositions, additions and omissions (Wanat, 1971, p. 8-158). The problem of proofreading is caused by the same characteristic of the normal reading process. It is difficult to concentrate on the total graphic display, suspending attention to meaning and syntactic information.

The principles of selectivity and reconstruction are compatible with several proposed models of the reading process (Roberts and Lunzer,

1968; Venezky and Calfee, 1970; Mackworth, 1971; Brown, 1970). These models show a strong human information processing influence.

The Roberts and Lunzer (1968) theoretical model started with the assumption that reading is a "skilled behaviour in which one engages to obtain information (p. 202)." Like Smith (1971), they saw reading as a process of uncertainty reduction operating at several levels: paragraph, sentence, phrase, word, letter and feature of letter. These levels were hierarchically organized so that as alternatives at one level were reduced to one, this information was cleared to the next and so on. Each level was connected in the model to those mechanisms which controlled the scanning and cue sampling so that the number of visual cues sampled from the graphic array depended upon the need for such information at the several levels of uncertainty reduction or decision making.

In the Venezky and Calfee (1970) model of the reading process as manifested in the idealized, competent reader, a scanning process, or cue-sampling procedure, was postulated that was directed by the reader's general knowledge of the nature of written materials, properties of the real or imaginary world, language habits and sentence types and by immediate knowledge gained from the material being read.

Mackworth (1971) presented a detailed, data-based model of the reading process which Geyer (1971) characterized as a model which:

undoubtedly represents the current consensus of expert opinion from a number of fields concerning the identification and operational characteristics of the information-processing systems involved in reading (p. 5-8).

Her detailed model of the stages of memory and coding processes

was more specific than the purposes of this present review require. However, the more general principles of selectivity and reconstruction underlie the precise constructs and processes which she postulated and supported. She wrote:

There is constant interchange and feedback at all stages between long-term memory and the input. The stimulus that reaches the conscious level of attention is often so altered from the original stimulus that a completely wrong word may be "read". Sometimes the feedback will bring this to the attention of the reader, but at other times it may go unnoticed (p. 8-92).

She also wrote, referring to the hierarchical probabilities of the relationships between words and phrases which readers have learned:

The result of developing these expectancies is that so long as the written material corresponds to the expectation, the reader can simply sample the text, leaping from one word to another further along the text to confirm his guess (p. 8-86).

Brown (1970) drew up a theoretical model of the reading process derived from a generative-transformational theory of language with certain analysis-by-synthesis modifications. This model incorporated the principles of selection and reconstruction and had much in common with the Halle and Stevens (1959) model of speech perception. The model showed the reader scanning the text with considerable syntactic and semantic expectancy. This produced a string of words or phrases which was stored in short-term memory. A search was made of this string for cues to its deep structure, the underlying, abstract base form. A deep structure was then hypothesized which was used to generate a surface structure. If a well-formed surface string was generated, analysis continued; otherwise the cycle was repeated.

Thus, in the literature of reading research there is considerable

support for the validity of the principles of cue selection and message reconstruction as important components of the reading process. Both empirical research and current theoretical models attest to their role in the processing of written as well as spoken language.

The Principles of Selection and Reconstruction and the Higher Level Interpretive Aspects of Processing

It has been established that a considerable amount of recent theory and research in both reading and listening has accepted the principles of selection and reconstruction as integral parts of the receptive phases of language processing. There seems to be little doubt that up to the point of deciding what the message is the reader or listener has been involved in selective and reconstructive activity.

The question of the relationship between the two principles and the higher level processes then arises. By higher level processes is meant those aspects of language processing which can be considered as the comprehension or interpretation components. Human information processing tends to be much less specific about these components than about the receptive phases. Models of human information processing speak of processed information being stored in long-term, or secondary memory (Biggs, 1969; Mackworth, 1971; Norman and Rumelhart, 1970). Norman (1969) admitted that, in spite of years of research, little was known about the mechanisms underlying secondary memory (p. 95). The term "cognitive structure" is frequently used to describe the organization of long-term memory (Ausubel, 1963; Neisser, 1967), and understanding a linguistic utterance is said to be the assignment of its information to a conceptual category within this cognitive structure (Brown, 1970,

p. 69).

Some theorists have postulated that these higher level processes operate as a separate set of cognitive mechanisms beyond the receptive phases of reading and listening. Deese (1969) wrote of comprehension in reading as a set of optional processes beyond recognition. He saw the reader monitoring the text at a level of awareness of its potential for interpretation, but without necessarily achieving the interpretation all the time. In rapid reading the burden of total comprehension would be too onerous. Brown (1970) seemed to be making the same point when he wrote:

The final optional step (in reading) is the process of understanding which is in itself a complete system on the order of complexity of the reading process (p. 68).

On the other hand, it has been argued that the receptive components of reading and listening are not independent of higher level components. Goodman (1970) acknowledged that semantic information is contributed by the reader to the guessing process of reading. Models of human information processing include feedback loops linking the receptive to the higher level processing stages. Instead of being sequentially ordered with interpretation following identification, the two could perhaps proceed simultaneously. A major argument proposed by Smith (1971) was that the identification of meaning can proceed independently of the identification of words and even "that comprehension of meaning normally precedes word identification (p. 195)."

The resolution of these apparently opposing views is not crucial to the present study. Whether the interpretation of meaning is a sequentially separate component of processing or whether it is intimately

bound up with the receptive component, the present argument is not affected. The achievement of meaning, interpretation or comprehension is inescapably affected by the principles of selection and reconstruction. If interpretation follows recognition of the linguistic unit, the fact that the perceived message has been derived from a process of reconstruction based upon selected cues means that what is understood, or assigned to a conceptual category, is what was reconstructed. The meaning cannot be independent of this. If, on the other hand, meaning is bound up with the process of reconstruction, then the two principles have a direct, rather than an indirect, bearing upon what is understood. Cues to meaning are part of what is selected and interpretation is the result of the process of reconstruction.

The Differences Between Listening and Reading as Selective, Reconstructive Language Processes

It has been shown that the two information principles of selection and reconstruction can explicate equally well the processes of listening and reading. The principles are based on the way language functions in communication and are principles of language processing as a whole. Considered within these principles, the two processes would seem to have much in common.

However, the question is whether there is any difference between the operation of cue selection and reconstruction as they apply to the processing of spoken language and written language. Since the concern of the study is spontaneous speech compared with formal writing

in terms of their processing, one area of difference would be the linguistic nature of the two inputs from which selections are made. Another, applying to listening generally as contrasted with reading, would be the nature of the perceptual mechanisms involved.

The Differences Between Spontaneous Speech and Formal Writing

Although the discussion of the two information processing principles attempted to show the role of information other than that contained in the input itself in reading and listening, the nature of that input must be considered as a crucial variable. As Neisser (1967) wrote: "The stimulus input is usually a primary determinant of the course of construction (p. 197)." The differences between the two kinds of linguistic input have been studied empirically and by subjective analysis.

Empirical Studies of the Differences Between Spontaneous Speech and Formal Writing

Several studies have been carried out comparing speech and writing using a method of language comparison which can be called "descriptive word statistics (Driemann, 1962, p. 36)," involving the counting of words or symbols. Horowitz and Newman (1964), in a study of the content and form differences between speech and writing samples collected from college students under strictly timed conditions, calculated the type-token ratio (TTR) for the speech and writing. This is the ratio between the number of different words used and the total number of words in a sample. The ratio for written language was

greater than that for spoken which can be interpreted as evidence that writing draws upon a wider range of vocabulary than does speech. This finding was the same as that of a study in French conducted by Fraisse and Breyton (1959) and that of a study in Dutch by Driemann (1962). In each case the TTR favoured the written samples.

The Driemann (1962) study revealed some interesting differences between speech and writing produced under identical conditions. The study was concerned with Dutch not English although it was reported in English. In presenting these findings no claim is made that they apply equally to English; they are included partly because of a dearth of such research in English and partly because of the similarity of the findings with those of studies in other languages. The subjects were eight graduate students each of whom produced a spoken text and a written text at different sittings as reactions to impressionistic landscape paintings. No time restrictions were imposed. It was found that the average number of words per spoken text was 216 while for the written texts it was 115. When the average number of syllables per word was calculated the figure for the spoken texts as a whole was 1.34 and for the written texts 1.63. This difference was interpreted as indicating that in writing subjects tended to use longer, more complex words. The number of attributive adjectives (predicate adjectives were not included) and verb forms were counted. It was found that the spoken texts, totalling 1733 words, contained almost the same number of attributive adjectives as the written texts, totalling 922 words. This indicates that writing contains proportionately more of this type of adjective than speech which could be

evidence that in writing meanings are more qualified and precise. The use of longer words in writing may be related to the same tendency. The number of verb forms was not found to distinguish between speech and writing. Driemann summarized his findings about written language as compared to spoken language as showing that it contained:

shorter texts, longer words, fewer words of one syllable, more attributive qualities and a more varied vocabulary (p. 54).

However, he pointed out that the small number of subjects and the brevity of the texts limited the generalizability of his findings.

The Horowitz and Newman (1964) study mentioned above found, in their content analysis of texts, that spoken language was more elaborated than written in terms of subordination. Written language tended to consist chiefly of main ideas. However, this could well have been an artifact of the design of the study since the writing was done under timed conditions without the opportunity to edit and revise that usually characterizes the writing situation.

Moscovici (1967), writing from the viewpoint of a social psychologist interested in the characteristics of speech and writing as modes of social communication, concluded, from a review of studies in English and French, that written language is generally more elaborate, less repetitious, and syntactically better structured than speech (p. 256).

De Vito (1965) studied the ease of comprehension of samples of speech and published writings produced by "skilled communicators," members of a university department of speech and theatre. The samples were 9,000 words in each medium. Randomly selected passages from

within these samples were prepared as cloze tests and administered to eighty-five undergraduate students. The samples were also analyzed for vocabulary load, sentence structure, density of ideas as indicated by the number of different content words, and human interest as revealed by the number of personal words and sentences.

One significant difference discovered was that the written samples contained more difficult words than the oral ones, difficulty being measured by word length and the number of words not appearing on the Lorge-Thorndike list of 30,000 words. The TTR of the written samples was significantly higher than that of the spoken. The written contained more simple sentences than the spoken, and there was a larger number of content words in the written samples, indicating a greater density of ideas. There was no difference between the two as measured by the cloze test indicating a comparable level of comprehension difficulty. There was no difference in sentence length.

The longitudinal research of Loban (1967) into the oral and written language development of children provided information relevant to the differences between speech and writing. In his analysis of oral language he identified a phenomenon which he called a "maze." This referred to a language tangle when a speaker would use a word or sequence of words which did not constitute a meaningful communication and which could be eliminated from the text of the speech without loss of meaning. It included false starts and unattached fragments. He found that for a group of grade twelve students, identified as high in language ability, maze words constituted 7.49 per cent of the total number of words in the speech samples. Loban also found, from analysis of the number of words

in communication units (defined as independent grammatical predications in a text), that in the early grades oral communication units contained more words than written ones. Then in grades five, six and seven the difference became much less clear cut, and in the high school grades written units were consistently longer than oral ones. Loban interpreted this as showing that high school students no longer write the way they talk, that their writing has become a more elaborated form of communication than their spoken language.

O'Donnell, Griffin and Norris (1967) studied the oral and written language production of students in kindergarten, and grades three, five and seven. They found that oral compositions were longer than written ones for all grade levels studied. While the word length of T-units was greater in the oral compositions at the grade three level, in grades five and seven it was the written T-units that were longer. The same tendency was noted with the number of sentence-combining grammatical transformations: in grade three the oral T-units contained more; in grades five and seven there were more in the written T-units. This was interpreted as showing that advances in the control of syntax in grades five and seven were more accelerated in the case of writing than in speaking (p. 95).

Subjective Studies of the Differences Between Spontaneous Speech and Formal Writing

While the empirical research reviewed above has been consistent in its findings that written language makes use of a more varied vocabulary and results in shorter texts than equivalent speech, a subjective analysis of the two reveals other differences. Spontaneous

spoken language is frequently incomplete, fragmentary, fumbling, full of mazes and false starts, and interspersed with repetitions, hesitations and stammerings. Abercrombie (1965) objected that such descriptions imply that speech is a substandard form of language compared with the norm of rehearsed writing. He pointed out that deficiencies like these tend only to become apparent when the speech of conversation is recorded and examined in a form that disembodies it from the setting in which it was produced. In a conversational setting part of the meaning of an utterance resides in the shared situation or context of the conversation. Part is also transmitted by the extra-linguistic signals of gesture and facial expression. The differences between spontaneous speech and formal writing are, therefore, differences of kind rather than degree. Speech is not structurally inferior to writing; its structure is much less self-contained and more interconnected with the non-linguistic situation in which it occurs. Writing, being separated in time and space from the situation which produced it, has to have a much more consistent internal structure since it alone carries almost the total meaning to be conveyed. Vygotsky (1962) described the essential characteristics of writing when he said:

It is addressed to an absent person who rarely has in mind the same subject as the writer. Therefore it must be fully deployed; syntactic differentiation is at a maximum; and expressions are used that would seem unnatural in conversation (p. 142).

Driemann (1962) stressed that writing is a much more selective process than spontaneous speech. After the experiment reported above, he prepared a comprehensive questionnaire about the differences

between the two media of verbal communication and used it in interviews with the subjects of the experiment and with a number of other subjects of a "high educational level". One of his conclusions from the data collected was that:

In writing the subject selects on "economical" grounds with a view to conciseness and is forced to cut short certain lines of thought. In fact, even if he tried, he could not write as fast as these crop up. . . . The text has to be "correct"; care is taken that the sentences flow well and that phrases liable to give rise to misunderstanding are removed. Moreover, a certain diffidence to commit oneself in black and white plays a part . . . (p. 94).

Wardhaugh (1969), discussing the task of learning to read, pointed out that the language of reading material is different from the language of speech to which the child is accustomed. He wrote:

By its very nature much of the content of writing is different from that of speech, because writing allows for (and on occasion demands) a more deliberate kind of language than does speech (p. 56).

The speed of production of spontaneous speech precludes planning. Writing, being more laborious, allowing time for thought, and being generally freed from a sense of urgency, can be more reflective, deliberate and edited. Vygotsky (1962) wrote:

Planning has an important part in written speech, even when we do not actually write out a draft. Usually we say to ourselves what we are going to write, this is also a draft, though in thought only (p. 144).

Planning, editing and often rewriting are necessary in print because written expression is frequently judged, not only for what it says--the quality of its content--but for how it is said--its form. It approaches almost the status of an artifact in its own right rather than as simply a vehicle for the communication of ideas. Thus style is an important aspect of literary criticism. Spontaneous speech,

on the other hand, does not lend itself to formal analysis, being a much more elusive and unobtrusive medium of communication.

In spontaneous speaking the language producer concentrates more upon the thoughts and ideas of his discourse than upon the form of the language to convey them. He begins to speak with an idea in mind without initially rehearsing the expression for choice of words or sentence structure. In writing, however, he must be conscious both of the thought and its expression. He is concerned with the logic of the substance of the discourse, with the selection of words to convey fine distinctions of meaning and with the construction of sentences which are grammatically complete and correct and which provide proper emphasis and clarity. In other words, the writer must be concerned with the substance, the grammar and the rhetoric of his discourse; the spontaneous speaker must concentrate on substance, having greater licence with grammar and rhetoric.

Perceptual Differences Between Listening and Reading

There are obvious perceptual differences between the processing of speech and the processing of writing. Since listening utilizes the auditory channel and reading the visual, it is obvious that the perception of speech involves the temporal dimension while the perception of printed symbols involves the spatial one. These two different dimensions impose different limits on the way in which language can be processed in the two media. For listening the rate of processing is determined by the speaker; the listener cannot vary

his rate of attention and comprehension independently without interfering with the communication. Linguistic units follow one another embedded in the acoustic stream of speech and they are available only as long as the memory can retain them. To some extent the listener can anticipate what will be said next, but he cannot with confidence get very far ahead of the speaker. In reading, on the other hand, the display is not a serial system of sounds but a spatial array of visual symbols. Given this condition, the reader is in command of his perceptual-cognitive strategies. He may vary his rate of processing to slow down, reread or pause to reflect; or to speed up to scan, skim or omit. These differences are reflected in the fact that whereas normal speech is uttered at a rate of between 150 and 200 words per minute, reading rates of 800 to 1,000 words per minute are not uncommon and claims for much higher rates are frequently made. Reading in this sense is a much more flexible means of language processing than listening.

Hochberg (1970) pointed out another difference between reading and listening arising out of the spatial and temporal nature of the two processes. Not only is the reader guided in his visual scanning and in his fixation points by the information he brings to the task from his knowledge of language and of the content, but he is also aided by peripheral vision (p. 222). He wrote:

His (the reader's) wide area of peripheral vision gives him an intimation of the future, of what will meet his next glance. And because eye movements are fully programmed in advance of their execution, any efficient sampling of the peripheral vision also tells him roughly where his present fixation fits in the overall pattern (p. 221).

There is no equivalent to peripheral vision in hearing; the only part of the message that is available is that which is being uttered at a particular moment. Unlike reading, listening has no physical clues to what preceded and what will follow. This fact may give additional flexibility to reading that listening does not possess.

If both reading and listening are processes relying on prediction and the confirmation of predictions, the temporal nature of speech would seem to make an important difference to its processing. If a prediction is untenable based on subsequent input, a reader may regress and recheck for more cues; a listener, however, cannot do this except, in certain circumstances, by asking a question or, in others, by replaying an audiotape. Foulke (1968), speaking of this disconfirmation of a prediction, said:

In the case of reading, if you disconfirm, then you can look back. The display is still directly available to you. But in the case of hearing, you can't listen back (in Kavanaugh, 1968, p. 149).

Although reading permits greater perceptual flexibility than listening, the perception of speech is facilitated by certain features and characteristics which writing lacks. Spoken language employs not only the segmental phonemes, the vowel and consonant segments, but also a system of suprasegmental phonemes: stress, pitch and juncture (Stageberg, 1965, p. 45). These produce the distinctive rhythms and patterns of intonation that characterize spoken language. In a sense they can be considered as a type of redundancy in spoken language. Intonation is not absolutely necessary to produce intelligible speech and is therefore redundant. It is an example of both "within channel redundancy (Garner, 1962)", in the sense that the superfluous signal

occurs within the same channel, the auditory, as the spoken words, and of "synchronic redundancy (Osgood and Sebeok, 1954)", in the sense that it is superimposed upon the units of the message. However, given the imperfections of the medium, the role of intonation in speech perception is vital. By this means the speaker signals to the listener the meaningful segments of his discourse.

In written language punctuation is a much more parsimonious system of cues to rhythm and segmentation. A question mark at the end of a sentence signals only that the sentence is a question, whereas a rising terminal pitch pattern in its spoken counterpart would identify it as a yes/no question. There is no consistent punctuation to identify such segments as prepositional phrase groups, nominals or certain types of subordinate clause groupings. The reader must perform this essential perceptual-cognitive operation himself. That it is essential to reading comprehension and not automatic in readers who have advanced beyond the word identification stage was shown by Cromer (1970). He found that when written material was presented in the form of natural unit segments a group of poor readers was able to comprehend at a significantly higher level than when material was presented in a sentence format. For good readers, however, there was no significant improvement. When the material was presented in single word format, the poor readers' comprehension was not impaired relative to their performance on the sentence format, while the good readers' performance was significantly impaired. These findings suggest that one component of reading success is the ability to segment written language into natural units larger than single words. Therefore, it is one of the

perceptual-cognitive strategies unique to reading since in listening to speech the redundant suprasegmental phonemes signal the essential chunking.

Implications of the Linguistic and Perceptual Differences
Involved in Listening to Spontaneous
Speech and Reading Formal Writing

The different nature of the inputs in listening to spontaneous speech and reading formal writing would seem to have strengths and weaknesses for both. Speech tends to use fewer difficult words or a less varied vocabulary. It provides a richer system of cues through the presence of intonation and the operation of the visual channel in face to face communication situations. On the other hand, it may tend to be characterized by a less well-controlled syntax and the presence of extraneous material caused by mazes, false starts and repetitions.

It may also tend to be less well-organized ideationally because of the absence of preparation, rehearsal and the opportunity for editing.

Writing has the disadvantage of being a single-channel system of communication, with all the information from the message having to be carried by the orthography. To compensate for this deficiency perhaps, writing is planned and edited and it presents its ideas in a more structured, logical way. The formalization of its grammar results in less inconsistency in its sentence structure.

Perceptually, writing is a more parsimonious medium of communication than speech. However, once reading has been learned and mastered it permits the reader more perceptual flexibility than does

speech. This question of flexibility, with the reader in command of his perceptual strategies and the listener dependent upon the speaker's rate of delivery, has implications for the processing of writing and the processing of speech in general. When the speech is spontaneous, the difference between the linguistic inputs together with the perceptual differences in their reception suggest that as overall processes listening and reading each have characteristics which are distinctive and unique.

It could be expected that this distinctiveness and uniqueness might be apparent in terms of those aspects of the processes that are covered by the principles of selection and reconstruction. The question then becomes, in view of the input and perceptual differences between the reception of spontaneous speech and formal writing, are the processing principles of selection and construction different as they apply to each medium? This leads to the problem of how to secure data which will reveal any such differences.

The Assessment of Listening and Reading Processes Through the Use of Reproduction, or Recall

As covert mental processes, listening and reading are not amenable to direct observation. In order to compare the two processes, it was necessary to devise a listening and reading task that would result in observable data. From these data inferences about the processes which were involved in their production would be made.

Bloom and Broder (1950), discussing the problems associated with research into mental processes, reported that a survey of the

literature revealed two main avenues of approach (p. 5). The first involved inferring the processes of mental activity from observation of its products through such tasks as problem solving and answers to questions. The second, direct exploration of the mental processes themselves, made use of introspection and retrospection.

The vast majority of research studies in reading and listening have utilized the products of structured question and answer tasks. Another type of product is recall of material read or listened to. Although laboratory-type studies of verbal behaviour have made extensive use of recall when tightly controlled stimulus materials have been employed, reproduction of the stimulus material has not been widely used in reading and listening research. The products of recall tend to be unwieldy and difficult to analyze objectively. However, when questions about material read or listened to are designed to measure the two behaviours, the question itself intrudes upon the process and the observed response to the question may be influenced as much by the question as by the reading or listening that preceded it. The technique of reproduction is free from this type of intrusion and the subject is free from any extrinsic prompting that might influence his performance.

Some early reading studies used free reproduction of material read as a measure of comprehension. Pintner (1913) compared the oral and silent reading comprehension of grade four students by having them write down as much as they could remember from the reading passages. Each passage was analyzed "in the customary manner" into the number of points, or thoughts, contained in it and the recall texts were then

graded as to the number of points reproduced (p. 335). Brown (1914) relied heavily upon recall in his three criteria for reading measurement: rate of reading, quantity of reproduction, and quality of reproduction. Farr (1971) stated that of these three criteria the quality of reproduction has tended to be overlooked in the development of reading measurement. The early use of recall tended to concentrate on the quantitative aspects including number of words and number of ideas recalled. A recent test, The Durrell Analysis of Reading Difficulty (1955), employed reproduction as a method of assessing comprehension. The Silent Reading subtest required the subject to reproduce orally what he had remembered from the passage.

These studies and tests used recall as a means of assessing reading skills, not as a source of data about the processes underlying reading. Research which makes inferences about processes from products depends upon a high relationship between the products and the processes of thought (Bloom and Broder, 1950, p. 4) and upon that relationship being as direct as possible. The difficulty about using recall as a source of data about the processes that went into the reception and interpretation of the material that is the object of recall is that the relationship is not direct. Other processes intervene between the initial assimilation of the material and its expression as recall. These include memory processes and processes of expression.

Consideration of the operation of memory involves both the processes by which information is stored and the processes by which it is retrieved from storage. Human information processing considers at least three types of memory, or storage systems, through which

incoming information is coded and held (Neisser, 1967; Norman, 1969). At this point in the discussion the first two of these, the iconic store and the short-term memory, or primary memory, are not considered since the concern is with the recall of continuous discourse whose length and complexity make its recall a question of long-term memory.

Long-term memory is considered to be a vast store of great capacity. Its actual functioning is more the subject of theoretical argument than direct empirical evidence. Norman (1969) characterized it as a complex store which information entered from the primary memory system as the result of a rehearsal process (p. 90). Bartlett (1932), while not at that date using the label, long-term memory, saw this kind of storage as a matter of interrelated schemata, "active organizations of part reactions, or of part experiences (in Norman, 1969, p. 137)". New information was not stored verbatim; instead it was integrated into the existing schemata. Ausubel's (1963, 1968) position, as made explicit in his Subsumption Theory, was very similar to Bartlett's. He stressed the hierarchical organization of cognitive structures into which new information was assimilated.

The processes involved in retrieval, or remembering, such as those required by a recall task were discussed by Bartlett (1932), following his studies of memory through the technique of repeated reproduction of short stories. He found that after his subjects read a short story accuracy of written report was the exception rather than the rule. The written recalls were characterized by attempts at "rationalization", or efforts "to render material acceptable, understandable, comfortable, straightforward; to rob it of all puzzling

elements (Bartlett, 1932, p. 89)."

In order to account for the changes which his subjects introduced into their written recalls, Bartlett (1932) proposed that since information is integrated into existing schemata, any discrepancies between the new material and the existing structure can result in things being remembered as they were expected to be rather than as they really were. In this way remembering was seen as a process of reconstructing past events rather than simply retrieving them. An event was remembered through the activation of a schema whose principles, logic and rules were used to reconstruct the event.

This constructive remembering seems to make use of one of the principles whose role in the initial reception and processing of information was strongly emphasized earlier in this chapter. Just as a message is received and interpreted by a process of reconstruction, so the retrieval of this message from memory is influenced by the same principle.

Since these kinds of memory processes intervene between the processing of the stimulus material and its recall when reproduction is used as a research technique, it is necessary that a rationale be established that would allow inferences from the products of the recall to be made about the processing of the stimulus material. This rationale drew heavily upon the Subsumption Theory of Ausubel (1963, 1968). Although this was a theory of meaningful verbal learning, the principles of the theory seemed applicable to the processing of linguistic input as well as its learning. Ausubel (1963) proposed a model of the cognitive organization of a learner which assumes the

existence of a cognitive structure that is hierarchically organized in terms of high inclusive conceptual traces (p. 24). Under these inclusive traces or generic concepts are subsumed less inclusive subconcepts as well as specific information. In Ausubel's words:

The major organizational principle is that of progressive differentiations of trace systems of a given sphere of knowledge from regions of greater to lesser inclusiveness, each linked to the next higher step in the hierarchy through a process of subsumption (p. 25).

Learning takes place when there is an encounter between this hierarchically organized cognitive structure and verbal material which is potentially meaningful in the sense that it is logically organized and psychologically relatable to the learner's cognitive structure. Learning depends upon the attachment of the new concepts or information to appropriate existing concepts, called anchoring subsumers. The strength of new learning partly depends upon the stability of these anchoring subsumers and upon the discriminability between them and the concepts in the material to be learned.

Another important concept in this theory is that of obliterative subsumption. Newly learned material does not retain an independent status in cognition, called dissociability strength by Ausubel (1968, p. 104), but is assimilated into the existing cognitive structure, modifying or supplementing it.

Ausubel (1968) identified three temporal phases in the meaningful reception learning and retention of verbal material: a learning phase, a retention phase and a reproduction phase. The learning phase refers to the time during which the new material with its potential meanings and information is available to the receiver to

be related to ideational systems in his cognitive structure. This could be called the presentation phase in terms of this present study. The retention phase refers to the time between learning and reproduction when the newly acquired meanings are gradually losing their dissociability strength and being assimilated into the larger cognitive structure. The reproduction phase includes any task that requires the recall of the original material.

Ausubel (1968) discussed, within this framework, sources of discrepancies between material as originally presented and reproduced memories of this material (p. 106). These may be listed as a set of factors allocated to the three phases discussed above:

A. Learning Phase

1. Unavailability of anchoring subsumers.
2. Instability of anchoring subsumers.
3. Lack of discriminability between anchoring subsumers and new materials.
4. Selective emphasis, omission and distortion that takes place as a result of initial interpretation of the presented material.

B. Retention Phase

1. The reductionist processes of assimilation.

C. Reproduction

1. The adjustment of the threshold of availability caused mainly by affective factors and task variables.
2. Problems of verbalization, or the problems of putting into words the material remembered.

This set of factors represented the basis for the rationale

for the use of the recall task. The products of a written recall task are the resultant of all three phases: presentation, retention and recall. When two inputs are being compared through the performance of two groups and when the writing of the recall takes place immediately upon the completion of the presentation phase, all factors other than the presentation are common to both groups. And, if the two groups are randomly drawn from the same population, all factors other than the presentation of the stimulus are experimentally controlled. Memory processes involved in the retrieval and expressive processes in the writing can be said to have been controlled by randomization, as can such variables as cognitive style, ability and others which impinge upon the performance of such a task. Thus, although the data for the comparison of processing variables are derived from memorial and expressive processes, any differences between the two sets of data obtained can be attributed solely to those processing variables. This can only be claimed for the differences between the two sets of data: the independent qualities of each set cannot be attributed to particular causes, so that the technique of reproduction can be used to compare reading and listening while it cannot be used to study one or the other independently.

There is one possible flaw in the argument just advanced. That arises from the fact that there is no neutral form of expressing the recall. Speech or writing has to be used. The use of one form might bias the experimental result in favour of the medium of presentation that used the same one. Horowitz and Berkowitz (1967), in a study of the effects of medium of presentation and medium of reproduction upon

the recall of connected discourse, did not report a significant interaction effect ~~when~~ writing was used as the medium of recall. That is there was apparently no difference between the recall of writers who listened and that of writers who read. However, they did find such an interaction effect when the recall was spoken. Speakers who read the material produced more omissions, more additions and fewer ideas than speakers who listened. The authors interpreted this as indicating that written presentation followed by spoken recall was subject to an interference arising from the change of medium. In a similar study by King (1968) in which one of the stimulus passages was the same as one used by Horowitz and Berkowitz (1967), no significant interactions were found for either medium of recall. The results of these two studies would seem to add support to the assumption that is inherent in the use of a written medium recall task to compare two mediums of presentation, namely that the use of writing in the recall does not differentially facilitate the reproduction of those who read as opposed to those who listened.

Summary

Two principles from human information processing, cue selection and message reconstruction, provided a theoretical perspective through which the broad research question motivating this study could be sharpened and given a clearer focus. Both listening and reading as language-based processes involving cue selection and message reconstruction have much in common. However, the possibility of divergence between reading and listening processes, as defined by the operation

of the two principles, is permitted when spontaneous speech is the object of listening. The different nature of the two linguistic inputs to the processes, spontaneous speech and formal writing, suggest that the selection of cues and the reconstruction of the message might be different for the listener and the reader. Especially would this be so when the different perceptual mechanisms prevailing in each case are included in the consideration.

Thus, the research question originally asked merely whether there were differences between the processes of listening to spontaneous speech and reading formal writing. Now the sharpened focus provided by the theoretical perspective rephrased it to ask whether there were differences between the two processes as defined by the operation of the principles of cue selection and message reconstruction that were caused by the different language inputs and perceptual mechanisms involved in each.

However, even this rephrased question was at a fairly high level of generality and it was desirable to achieve greater specificity. Therefore, before proceeding directly to collect data which would provide an answer to the question, a preliminary step attempting to further reduce the generality in the question was taken. The review of the literature in this chapter had revealed that one major difference between listening to spontaneous speech and reading formal writing was the nature of the two linguistic inputs. The preliminary step involved a closer examination of this difference using empirical data. The objective was to achieve a better understanding of the difference in the expectation that this in turn would lead to a further refinement

of the research question.

This preliminary comparison between spontaneous speech and formal writing in registers closely equivalent to those used in the major comparison of the study is referred to as the major pilot study. The description of this pilot study forms the subject matter of the following chapter together with the discussion of the findings which led to a further refinement of the research question.

CHAPTER III

THE MAJOR PILOT STUDY: A COMPARISON BETWEEN SPONTANEOUS SPEECH AND FORMAL WRITING

Introduction

As indicated in the previous chapter, the perspective from which the comparison between reading and listening was made was one provided by two human information processing principles, cue selection and message reconstruction. These two principles, constituting in effect a definition of language processing, emphasized the similarities between the two processes. However, it was argued in Chapter II, using empirical evidence and subjective analysis obtained from a review of the literature, that a major source of differences might be the different natures of the two linguistic inputs involved. The fact that the language of spontaneous speech was said to be so different from that of formal writing could be a source of difference in the processing activities of listeners and readers.

In order to indicate more precisely what these differences were in the language registers involved, a major pilot study was conducted in which samples of spontaneous speech and formal writing were analyzed and compared. The results of this major pilot study enabled the research question to be restated making it more specific. This present chapter sets out to describe the major pilot study. It describes the source of the language samples studied, the analysis procedures and the findings revealed.

Language Registers

In the study itself the comparison between listening and reading was effected through the use of stimulus materials that were classified as belonging to specific language registers. The selection and definition of these registers is described fully in the following chapter. As far as possible the comparison between spontaneous speech and formal writing used in the major pilot study involved corresponding language registers so that the findings from the pilot study would have maximum relevance for the study as a whole.

The oral language samples used as stimulus materials in the study itself were classified as argument in the form of spontaneous discussion produced by articulate grade eleven students and recorded on videotape. The oral language samples employed in the major pilot study were exactly equivalent to the oral stimulus materials. In the case of the written samples there was not the same degree of equivalence. In the study itself the written stimulus passages were prepared by the investigator himself in order to achieve equivalence of content with the oral materials. In the major pilot study the written samples were produced by articulate grade eleven students too. However, in both cases the written materials used were samples of formal writing.

The Source of the Language Samples

A group of fourteen grade eleven students formed the subjects for the pilot study. They were drawn from an accelerated second year English class in a small urban high school. This high school served a predominantly middle class area of the city of Edmonton. The

fourteen students were a select group, chosen by the Head of the English Department and their English teacher because they were felt to be articulate and highly verbal students. At the time of the collection of the speech and writing samples thirteen of the students were aged sixteen and one was fifteen. There were seven girls and seven boys.

The Collection of the Speech and Writing Samples

The samples of both speech and writing were collected in one two-hour session with the group as a whole present. This had been preceded one week earlier by a forty-five minute introductory, explanatory session.

A large, comfortable study room was made available by the school. In this room a Sony Half-Inch New Format Videocamera and 3600 Videocorder were set up together with a sound tape recorder.

The students were divided into pairs and asked to prepare a simulated interview discussion, one of the pair being the interviewer and the other the interviewee. They were asked to choose a topic about which the interviewee felt confident and about which he could present reasoned arguments to support a point of view. They were not allowed to use notes for the spoken presentations, except for brief notes of questions for the interviewer.

Four teams then went through the videotaped interview situation unrehearsed. Each pair of students was seated before a low table facing the video camera. No lighting other than the regular room lights was used.

While these four teams were producing the oral discussions, the remaining three teams were instructed to carry out the interview in written form with each student acting as both interviewer and interviewee. Each student wrote down the first question for his partner and then papers were exchanged again and the process repeated. This went on until they felt the topic had been exhausted.

Following this, the students who had been videotaped were asked to go through the written interview procedure using the same topic as in their spoken interview. The three teams which had produced the written interviews were then videotaped presenting an oral version of the same topic. In this way an attempt was made to reduce the possibility of systematic order effects which might have influenced the two types of language produced.

As a result of these procedures, seven subjects acted as interviewees in the oral discussions and the same seven performed the same role in the written discussions. Each of these seven had, therefore, produced a sample of his written language and a sample of his spontaneous spoken language in situations that were comparable in all respects except the medium of production. The total texts of these seven oral discussions and the seven corresponding written discussions were the data for analysis. These texts were transcribed for analysis exactly as spoken and written.

Analysis of the Speech and Writing Samples

The purpose of this analysis was to describe as precisely as possible some of the relevant differences between the two language

registers. In many cases the language phenomena involved in this analysis required detailed definitions. Full details of these definitions and of the analysis procedures have been included in Appendix A.

The analyses carried out in this pilot study were non-statistical in view of the small, nonrepresentative sample involved. The results of these analyses were reported in terms of frequencies and means and no generalizability was claimed.

Length of Discussion Texts

Several studies have found that the length of spoken texts is greater than that of written texts produced under equivalent conditions (Driemann, 1962; Fraisse and Breyton, 1959; Horowitz and Newman, 1964).

The number of words in each text was counted after audible pauses and maze words had been marked and excluded. The mean numbers of words in the seven oral and seven written texts were calculated.

Extraneous Material or "Noise"

A feature of spontaneous speech that is not normally present in writing is the incidence of non-meaningful, extraneous material that is not essential to the speaker's intended meaning. Three types of such extraneous material were identified: audible pauses, mazes, and "filler" words.

An audible pause is an "em" or "er" sound that many people include in their spontaneous speech. Mazes are those false starts, word tangles, and adjacent repetitions which are frequently present in spontaneous speech. "Filler" words refer to a small class of words

and expressions that speakers often seem to use in much the same way as they use audible pauses, namely to cover a silence while words or ideas are being retrieved. "Well", "you know", "like" are examples of "filler" words.

The incidence of these "noise" phenomena in the seven oral discussion texts was recorded and frequencies and means were calculated.

T-Unit Analyses

While there are often obvious differences between the syntax of spontaneous speech and formal writing in the sense that a typescript of spoken language would rarely be mistaken for a written text, this difference is difficult to measure quantitatively.

Some research has been carried out into the development of control over syntax using as a unit of measurement the C-unit, or the T-unit (Loban, 1967; Hunt, 1965; O'Donnell *et al.*, 1967). A T-unit is what Hunt (1965) called a "minimal terminable unit". T-units are the "shortest grammatically allowable sentences into which [texts] could be segmented (Hunt 1965, p. 21)." Each unit contains only one main clause together with any subordinate clauses grammatically attached to it.

The argument for the T-unit as a measure of syntactic control rests upon the assumption that the use of subordinate structures in speech or writing indicates greater control over expression than the use of coordinated main clauses. This greater use of subordination is reflected in larger T-units. This unit was used to see if it would reveal differences between the spoken and written discussion samples.

(Detailed definitions and segmentation procedures are given in Appendix A).

The mean length of T-units was calculated by dividing the total number of words in all seven spoken texts by the total number of oral T-units, and the total number of words in the written texts by the total number of written T-units.

Following the procedure of Hunt (1965), four categories of T-unit length were established: short T-units of less than nine words, medium-short T-units of nine to twenty words, medium-long T-units of twenty-one to thirty words, and long T-units of over thirty words. The distribution of these four types of T-units throughout the spoken and written texts was calculated.

Linguistic Deviance

The spoken and written discussion texts were analyzed in terms of the acceptability of their component sentences as well formed English sentences.

Recent linguistic theory (Chomsky, 1957; 1965) has postulated that language behaviour consists of two aspects: competence, or the underlying abstract linguistic ability possessed by all native speakers of a language; and performance, or the actual application of this underlying ability in a language-using situation subject to other interfering variables like memory and articulation.

Butters (1967) argued that the dichotomy between competence and performance is an inadequate model of human language processing. Faced with natural discourse, the ability to interpret the utterances of which it is composed depends upon more than the possession of an

abstract body of language rules onto which the utterances can be mapped. The problem is that human beings are able to understand a wide range of utterances that deviate in one way or another from forms that can be accounted for by a competence model of grammar. Different kinds of deviation are peculiar to different language-using situations, or registers. Butters argued that it is uneconomical to assume that the human organism internalizes a different set of grammatical rules to enable him to cope with each unique register he encounters. Instead he proposed a set of "extension rules" by means of which the receiver of a language message could relate a deviant utterance to a grammatical form in his competence model (1967, p. 18). He wrote:

. . . these rules allow the mapping of a given core grammar into different but closely-related grammars of different registers . . . (p. 18).

Butters identified three types of deviance that such extension rules could be applied to: syntactic deviance, semantic deviance, and deviance in performance, which he labelled "operative" deviance (p. 9).

The first, syntactic deviance, refers to those utterances which are not well-formed grammatical sentences, sentences that would not be generated by a complete grammar of the language. The second, semantic deviance, refers to utterances whose meaning is odd because of the use of anomalous or inappropriate words. The third, operative deviance, refers to utterances which, while syntactically and semantically acceptable, are excessively difficult to interpret through length or grammatical complexity. That is they are deviant in the sense that they are unusually long and complex not because of the inherent

difficulty of the concepts involved.

These concepts were used in the present study to examine the spoken and written samples. An attempt was made to see if the two types of language varied in terms of the types and degree of deviance which each manifested. The problem was how could the texts be analyzed when there is no complete grammar of English available to use as a yardstick to assess the deviance of sentences they contained?

Linguists have frequently relied upon the intuitions of native speakers of a language as a means of assessing the acceptability of sentences (Butters, 1967, p. 30). This involves the rating of sentences as either grammatically acceptable or unacceptable by subjects whose only qualification is that they are native speakers of the language.

This technique was used as a means of gauging the linguistic deviance of the speech and writing samples.

Each of the seven spoken discussions and each of the seven written discussions was segmented into its component sentences after the elimination of all extraneous material. In the written versions the original writer's punctuation was used to identify the sentence segments. The spoken versions presented some problems since the sentence unit was not always clearly indicated. In cases like this the arbitrary judgement of the investigator was used to decide where sentence boundaries occurred. Single word utterances like "Yes" and "No" were counted as separate sentences, as were utterances that were syntactically incomplete if they occurred in isolation as a response to a question. The sentences from each text were numbered consecutively and typed up in list form and duplicated. The context for each

sentence was thus preserved.

Nine judges then rated each sentence from each of the fourteen texts as acceptable or unacceptable in the three dimensions, syntactic, semantic or operative. Each judge worked through one text at a time using a set of definitions and a specially prepared answer sheet. The texts were distributed to the judges in a random order and they performed the ratings at different times over a period of several weeks. The nine judges each had a minimum of four years of university education, and eight of them were doctoral students. All were native speakers of English.

Following the example of Quirk (1968), the judges were instructed to rate each sentence on the basis of a snap judgement for each dimension.

The number of unacceptable ratings each sentence received in each of the three dimensions was tabulated. These were summarized for each text in terms of the number of sentences that received no unacceptable ratings in a particular dimension, the number that received one such rating, two, three and so on. The results of this tabulation expressed as frequencies and proportions are given later in this chapter.

Subjective Analysis

In many cases the content of a spoken discussion and of its written equivalent were very similar. The questions were the same and the answers quite closely equivalent. A subjective, non-qualitative examination was made of the way the expression and organization of

certain common points and arguments differed across the two media.

Results of the Analysis of the Speech and Writing Samples

Length of Texts

The results of the word count for the two sets of text are shown in Table III-1.

TABLE III-1
MEAN NUMBER OF WORDS IN THE SPOKEN AND WRITTEN TEXTS

Oral Samples n = 7	711
Written Samples n = 7	400

Table III-1 shows that the mean length of the oral texts was 1.78 times as long as that of the written texts. This result was quite close to that reported by Driemann (1962) who found that the spoken language texts produced by his adult subjects was 1.88 times as long as their written texts (p. 41).

Thus, a spoken discussion tended to produce more words than its written equivalent. That is not to say that this is a difference between speech and writing since no attempt was made to control the number of ideas produced in each situation. The difference was not simply a matter of speech using more words to express the same ideas than writing. It seemed likely that the greater volume of spoken

language could be attributed both to a parsimony of written expression and a greater flow of ideas in a speaking situation.

Extraneous Material or "Noise"

A striking difference between the spontaneous spoken discussions and the written discussions was the presence of extraneous, non-meaningful material in the spoken texts. The elimination of this material, made up of audible pauses, mazes, and "filler" words, did not detract from the meaning of the text. Data relating to the incidence of these phenomena in the spoken samples are shown in Table III-2.

These phenomena do not occur in normal written discourse in its final edited form. After writing, the students were asked to proofread their texts before handing them in. Presumably as a result of this proofreading, there was none of this extraneous material in the written texts.

TABLE III-2

MEAN NUMBER OF OCCURRENCES OF "NOISE" PHENOMENA
IN THE SEVEN ORAL DISCUSSION TEXTS

	Mean number of occurrences per text (n = 7)
Audible pauses	23.3
Mazes	11.9
Maze Words	21.3
"Filler" Words	15.7

In the seven spoken texts a total of 83 mazes were identified, producing the mean per text of 11.9 shown in Table III-2. These mazes contained a total of 149 words or initial parts of words. It was noticeable that mazes were rarely of considerable length, seeming to be caused less by the speaker becoming lost in his sentence constructions than by false starts, choice of an inappropriate word which was immediately corrected, and repetition of words, perhaps as an alternative to an audible pause. Two discussions accounted for over half of the mazes and the maze words, indicating that the occurrence of mazes varied widely from individual to individual.

The proportion of maze words to total number of words in the seven oral texts was 3.0 per cent, considerably less than the 7.9 per cent reported by Loban (1967) for a group of high ability grade twelve students. This difference could be attributable to the particular register of language involved in this present study and to the small size of the sample involved. Also the fourteen students who formed the sample in this study were selected because they were articulate; and infrequency of maze words could be a feature of articulate speech.

A similar variation was evident in the occurrence of audible pauses. At one extreme, one text contained fifty-three, while another two texts recorded thirteen each.

Closely associated with the phenomenon of audible pauses is that of "filler" words and expressions such as "you know," "well," "like," and "I mean." These were expressions that seemed to occur when the speaker was searching for a word or a phrase. Their use seemed to be somewhat idiosyncratic in the form of an established oral

language habit. For example, in one text of 257 words the expression "like" occurred as a filler seven times in such contexts as, "That causes a transportation problem because like they have to commute to the city every day." Another text of 729 words produced the filler expression, "you know", nine times. One example was, ". . . and then you know things will develop from there."

Thus, audible pauses, mazes and filler words were components of the spoken discussions which had no equivalents in the written versions. They did not seem to convey information directly relevant to the message intended by the speakers. They seemed to represent performance defects of speaking which presumably the listener has to filter out in order to leave the intended message clear of unintentional "noise".

T-Unit Analyses

The mean length of T-units. The mean length of T-units in both types of discussion was analyzed and the results are shown in Table III-3.

TABLE III-3

MEAN LENGTH OF T-UNITS IN THE ORAL AND WRITTEN DISCUSSION TEXTS

	Total number of words	Total number of T-units	Mean number of words per T-unit
Oral texts (n = 7)	4977	323	16.4
Written texts (n = 7)	2800	197	15.2

Table III-3 shows that the mean length of the oral T-units was slightly longer than that of the written ones. This finding was different from the results of similar analyses obtained by Loban (1967) and by O'Donnell, Griffin and Norris (1967). Loban reported that in the early grades children's oral T-units were on the average longer than their written ones. This difference was reversed in the case of the high school students in his sample whose written T-units were on the average longer than their spoken ones. O'Donnell, Norris and Griffin (1967) reported that even by grades five and seven the mean length of written T-units was longer than that of oral units. In both cases these results were interpreted as showing the development of greater syntactic control over writing than over speech as children moved through the grades.

As in the case of the proportion of maze words this discrepancy with the findings of earlier research might be traceable to the restricted nature of the Phase One sample. Perhaps the fact that the students were chosen on the basis of their articulateness biased the sample in favour of spoken discussion, thus accounting for the longer spoken T-units. Also the particular register of language involved may have contributed to the different result.

Proportion of T-units of different length. Table III-4 shows the results of an analysis of the oral and written discussion texts in terms of the distribution of types of T-units.

TABLE III-4

THE PERCENTAGE OF OCCURRENCE OF T-UNITS OF DIFFERENT
LENGTH IN THE ORAL AND WRITTEN TEXTS

T-unit length in words	Oral texts (n = 7)		Written texts (n = 7)	
	Number	Percentage	Number	Percentage
Short: 1-8	99	30.7	52	26.4
Medium short: 9-20	149	46.1	110	55.8
Medium long: 21-30	45	13.9	26	13.2
Long: over 30	30	9.3	9	4.6

Table III-4 shows some small differences between the distributions of the four types of T-unit. The written texts contained a slightly smaller proportion of both short and long T-units than the oral ones. These differences, together with the larger proportion of medium short units in the written texts, suggested that the students tended to write T-units that displayed less variety in length than the ones they spoke. The writing was more uniform in respect to T-unit length.

Linguistic Deviance

Table III-5 shows the number and proportion of sentences from all seven oral and all seven written discussion texts which were rated as unacceptable by at least one of the nine judges. Each deviance dimension is shown separately.

TABLE III-5

THE NUMBER AND PROPORTION OF ORAL AND WRITTEN SENTENCES
RATED AS SYNTACTICALLY, SEMANTICALLY OR OPERATIVELY
UNACCEPTABLE BY AT LEAST ONE JUDGE

Deviance Dimension	Oral Sentences n = 260		Written Sentences n = 173	
	Total Sentences	Percentage	Total Sentences	Percentage
Syntactic	158	60	74	43
Semantic	87	34	41	24
Operative	98	38	45	25

Table III-5 shows that a large percentage of sentences in each medium failed to escape an unfavourable rating by at least one judge. However, the deviance of some of the sentences which had been rated as unacceptable by only one judge was not readily apparent, suggesting that the intuition of an individual native speaker was not necessarily a reliable measure of deviance. For example the following sentences were rated as syntactically unacceptable by only one judge out of the nine:

1. Secondly I feel that there are too many legal drugs on the market already.
2. I think extra-curricular activities are beneficial to each student but just up to a certain point.
3. And I think that eventually this will be the Canadian identity, a biculturalistic identity, which, if you think about it, actually has a great potential.

Table III-5 represents what is probably an excessively rigorous

analysis of the deviance of the two sets of sentences. Table III-6 presents the results of a similar analysis with those sentences rated as unacceptable by a majority of the judges--at least five out of the nine--shown as totals and proportions.

TABLE III-6

THE NUMBER AND PROPORTION OF SENTENCES IN BOTH SETS OF TEXTS WHICH A MAJORITY OF JUDGES RATED AS UNACCEPTABLE IN ONE OF THE CATEGORIES OF DEVIANCE

Deviance Category	Oral Sentences (n = 260)		Written Sentences (n = 173)	
	Total	Proportion	Total	Proportion
Syntactic	29	11.2	9	5.2
Semantic	8	3.1	0	0.0
Operative	22	8.5	5	2.9

Table III-6 shows that in all three dimensions a larger number and proportion of oral sentences were judged to be unacceptable by a majority of the judging panel. The following are examples of sentences which at least five judges rated as unacceptable.

Syntactically Unacceptable

- 05 1. What about students who get suddenly deeply involved in something, be it a club or a sport, and find that because of their involvement their averages beginning to drop, their grades are going down? (7 judges)
- 04 2. For example a fringe player in the NHL comes over to the WHA team such as Edmonton and your Edmonton finds that they cannot afford and they fold. (6 judges)

Semantically Unacceptable

02 1. This doesn't idealize itself yet. (5 judges)

04 2. And this is an attempt as they figure so the fans will come and see the fighting aspect of it if they can't get enough good players to show the actual game, well not the game but the calibre of the game itself. (6 judges)

Operatively Unacceptable

02 1. That is we're developing certain things in our culture such as national ballet and music and other things which are definitely unique Canadian aspects which point towards a definite unique Canadian identity. (5 judges)

06 2. But the petitions and such, there's so many of them being sent to government officials that I think they're losing their effect, but they're good to do, something you can do.

(8 judges)

What was surprising from this analysis was that such a large proportion of the written sentences should be rated as unacceptable, even by a majority of the judges. It was expected that selected grade eleven students would have produced writing that was relatively free of these kinds of shortcomings. However, it should be remembered that these were selected on the basis of their articulateness, not their writing ability. Had these students been selected because of the quality of their written expression the results could probably have cast the written sentences in a more favourable light.

However, the results of this analysis of the linguistic deviance demonstrated by the two sets of sentences show that a greater

percentage of the orally produced sentences were rated as unacceptable by the nine judges than written sentences. This was true of all three types of deviance as indicated by the unacceptable ratings made by the judges. With deviance defined in this way, the oral texts could be said to have had a larger deviance component than the written texts.

Subjective Analysis

Although the written discussions and the spoken discussions took place without close reference to each other, the participants relying on memory, there were questions and answers which were closely equivalent between some written discussions and their corresponding oral one. In cases like this a subjective examination was made of the ways in which the expression of similar ideas and arguments differed across the two media.

From this examination it seemed possible to extract certain tentative generalizations about the nature of written and spoken expression of similar ideas.

First, writing often seemed to possess a greater precision of expression than speech. This was shown by the following extracts from the spoken and written answers of one of the subjects discussing the differences between the effects of alcohol and marijuana:

ORAL

I think we have to go to clinical testing and this sort of thing by noted scientists and people who know what they're doing to obtain results like that.
(30 words)

WRITTEN

I feel these types of statements must only be made by clinical testers who are qualified and approach the subject in a scientific manner.
(24 words)

As well as being more concise, the written sentence is characterized by an exactness of expression which the oral sentence lacks. The latter employs phrases like, "I think we have to go to," "and this sort of thing," and "who know what they're doing." These phrases seem to be more colloquial and perhaps dependent more upon the context of the subject of discussion for exact interpretation. The written expression, on the other hand, is much more self-contained, closed and precise. This same difference in precision is shown by two other examples. These equivalent extracts were taken from a discussion about the World Hockey Association at the point where the speaker (a girl) was discussing the disadvantages of the new league:

ORAL

The main one [disadvantage] is the lack of hockey players and executives like good one calibre hockey players. The NHL has had enough trouble itself trying to stock its expansion teams, particularly ones like L.A. and California with good players, ones that can meet up with such teams as Boston and Montreal and New York. And I feel that the WHA is going to have even more difficulty. See cos the ones that are good right now, I mean the NHL, unless they're able to lure them away, they're going to have quite a bit of difficulty.

WRITTEN

The main one is lack of good players and executives for the teams. The NHL itself has had trouble getting players to get the teams such as Los Angeles and California up to the par of such established teams as Boston and Toronto. Therefore I feel the WHA will also have trouble finding high-calibre players to stock their teams. Also there is much comment on the fact that there is a lack of good hockey executives--coaches, managers, etc. Many of the ones that are good are already employed by the NHL. Therefore where will the WHA be able to obtain good executives unless they can lure them away from the NHL?

A second difference between the two types of discussion, was in the provision of structural markers (Becker 1965, 1966). These

refer to the signals which a writer or speaker can use to indicate the progress or structure of his discourse. Words and expressions like "first of all," "secondly," "finally," and "in conclusion," are like signposts to the reader or listener helping him to see the shape of the message. In argumentative discourse these would seem to be widely used to indicate steps in an argument and to emphasize conclusions.

Both the spoken and the written texts contained these markers, but in the case of the spoken they were often less systematic and complete. The speaker would frequently begin an answer to a question and include a word or expression which suggested that a series of points or arguments would follow. Then after the first point was presented and elaborated, the series was not continued. For example, the girl discussing the WHA began an oral answer with:

There are several reasons why I'm against the W.H.A. First of all. . . .

She then gave one reason and terminated the answer. Her written answer, on the other hand began with:

Personally I am against many of the aspects of the W.H.A. First. . . .

It continued after this point was exhausted with:

Another reason I am against the W.H.A.

and it concluded with a summary sentence that began:

These and other reasons are. . . .

It seemed as though in the writing that once the author had committed herself to a system of structural markers it was more likely to be followed through to its predictable conclusion. In the spoken samples, on the other hand, it was more likely to be abandoned incomplete, thus

perhaps acting less as an aid to the listener than as a distraction in the sense that anticipations were aroused which were not subsequently satisfied.

Implications of the Results of the Analysis of the
Speech and Writing Samples for the Processing
of Spontaneous Speech and Formal Writing

The analysis of the seven spoken discussions and the seven written discussions revealed differences between the two forms of language production which relate to the question of differences between listening and reading processes.

First there is a substantial "noise" component in spontaneous speech in the form of audible pauses, mazes and filler words which is entirely absent from writing. One can speculate on the way this phenomenon might influence comprehension in listening. It may be argued, as Butters (1967) did that this performance defect imposes an additional task upon the listener, that of filtering out the extraneous material. Given the fact that a person's language environment probably consists of a large proportion of spontaneous speech input, especially in infancy, the development of such a filter device seems an entirely reasonable postulate. Perhaps the effect of this extraneous linguistic material is a matter of degree. Up to a certain point its presence is perhaps unobtrusive and it may even aid the listener by slowing down the flow of meaningful information. However, beyond that point, the presence of a great many audible pauses, considerable maze material and frequent filler words may distract and even irritate the listener to the extent that processing is sharply reduced. It also probably

interacts with other factors such as motivation and interest.

The T-unit analysis revealed only small differences between the two samples. Oral T-units were slightly longer on the average and they displayed more variability. Such small differences would not seem to have very critical implications for processing in each medium. It may be that the longer, more variable T-units of speech do include a larger proportion of complex and difficult ones which impose an interpretation difficulty upon the listener. However, such a conclusion is very speculative.

Perhaps the most significant finding was the fact that the spoken samples contained higher proportions of sentences that were judged to be syntactically, semantically and operatively deviant. The interpretation of deviant sentences must be a different task than the interpretation of sentences that conform to the rules of grammar and usage which constitute a particular language. It would seem that such sentences would be less predictable.

It was argued in Chapter II that listening and reading are processes that are dependent upon the principles of cue selection and message reconstruction using information other than that in the acoustic or graphic display. An important source of other information was said to be the receiver's knowledge of language, including knowledge of syntax and semantics. It would seem that a deviant sentence by definition could be less predictable than a well-formed one in the sense that it departs from established usage and language rules. It was shown in studies by the Project Literary Group (Wanat, 1971, p.166) that linguistic structures that were less predictable were sampled more

densely for cues and took longer to process. If this were also true of deviant spoken sentences, the processing of such speech could be expected to be slower with more cues having to be sampled from the text.

Another effect of deviant sentences could be that their meaning is less clear, precise, and certain. A listener was said to reconstruct messages on the basis of hypotheses about their structure and meaning. This process operates under the constraints of preceding and succeeding processing and sampling. An hypothesis is strongly influenced by previous context and its confirmation depends upon following sampling being consistent with anticipations. The rules of well-formed sentences form a tight system of constraints which signal an inconsistent hypothesis and require its being changed to an acceptable alternative. If these constraints are loosened, for example, by the intrusion of deviant structures, incorrect hypotheses might not be so easily detected. In other words, the listener to spontaneous speech might be allowed greater latitude of interpretation through the loosening of the linguistic constraints which partly control it.

When operatively deviant sentences are encountered in speech they may impose a heavy burden upon the processing system. A reader encountering such a sentence might reread it; however, a listener has no such recourse unless he can ask for clarification. He must let it pass without full interpretation or impose an interpretation upon it which may or may not be correct.

If the tentative conclusions from the findings of the analysis of the differences between spontaneous spoken language and written

language could be condensed into a single predictive statement about the nature of the two types of processing, it might be that processing of spontaneous speech probably demands a certain arbitrariness of interpretation. The linguistic and rhetorical restraints upon written language are more apparent and inviolable, enabling written language to communicate with a precision and definiteness that spontaneous speech lacks. In information theory terms, writing serves to reduce uncertainty more than spontaneous speech. In order to achieve an interpretation the listener must impose a meaning reconstruction upon the material since it lacks precision. If processing is an interaction between existing cognitive structure and new material, the influence of cognitive structure might be relatively greater in the case of listening. The listener may be permitted to hear what he thinks he hears or what he wants to hear. The meaning for the listener, therefore, might be more idiosyncratic, more variable around any consensus point, than it is for the reader. The reader must accommodate more to the meaning of the material; while the listener, because of the greater ambiguity of the spoken material, is permitted more latitude in the assimilation of the new meanings to his existing cognitive structure.

Such an interpretation is speculative and has proceeded far beyond the data from the major pilot study. However, it is speculation that arose from certain observations about the differences between spontaneous speech and formal writing. It can also be related to the theoretical framework which was discussed in Chapter II.

Summary

The study started out with a very general question about the differences between two types of language processing. Some refinement was achieved by the adoption of a theoretical perspective. Further specificity was possible as the result of the comparison between spontaneous speech and formal writing as inputs into the processes of listening and reading. The question could not be rephrased to ask:

Considering reading as a process involving cue selection and message reconstruction, does it differ from listening to spontaneous speech in that it demands a greater precision and exactness of reconstruction?

The major purpose of the study, however, was to attempt to answer this question by means of the analysis of data obtained from a written recall task and the building of a logical argument to account for any differences revealed. Chapter IV presents the design for the provision and analysis of these data.

CHAPTER IV

THE DESIGN OF THE STUDY

Introduction

Having compared spontaneous spoken language and formal written language as the two inputs into the processes of listening and reading in the major pilot study, the main purpose of the study was to address the question of differences between reading and listening as language processing activities. The research design created to provide an answer to this question is the subject matter of this chapter. Included will be a detailed account of the decisions which were taken to select and define precisely the registers of language which were to be included in the comparison. This will be followed by a description of the population and experimental samples, of three minor pilot studies related to the use of the written recall task, and of the collection of the written recall data. The analysis of these data will be discussed together with a description of the statistical procedures which were used to test them.

The Choice of Language Registers

Catford (1965) wrote that "the concept of a whole language is so vast and heterogeneous that it is not operationally useful for many linguistic purposes, descriptive, comparative and pedagogical (in Gregory, 1967, p. 177)." Since language is produced

under a multitude of circumstances by different people for a wide variety of purposes, it was essential to define the particular registers of language which were being compared in this study. Four dimensions of language variation were used to achieve this definition: mode of discourse, recording medium, source of oral language and user-medium relationship. Some of the choices that were made within these dimensions were based on subjective judgement; others were the result of attempts to produce and prepare actual materials.

Mode of Discourse

Discourse has traditionally been separated into four modes: exposition, argument, narration and description (Daniel, 1967). Beardsley (1966) offered an alternative classification. He distinguished assertive discourse, which is made up of propositional statements that are either true or false, from non-assertive discourse. Assertive discourse was then broken down into argument, consisting predominantly of statements which are reasons for other statements, and exposition. Description and narration were classified as types of exposition. In actual practice it is rare that a pure mode of discourse will occur; usually a text will contain several kinds together. In this case, for a text to be labelled as a particular mode such as argument the type of discourse that predominates determines the category.

Authorities in the field of reading have long been aware of the different reading demands of the various subject disciplines and have urged that reading not be considered as one skill applicable

to all areas, but as a composite of many skills, acknowledging the content-cognitive demands of the different subject areas. In the same way it seems reasonable to suppose that the reading of an argumentative passage requires different strategies than the reading of a descriptive, narrative, or expository passage, irrespective of subject area. For these reasons it was considered important that the speech and writing involved in this study should be confined to one mode of discourse.

The mode chosen was argument. This mode is perhaps the most clear-cut, and consequently a pattern of argument could be reduplicated in the alternate version, either oral or written, helping to achieve equivalence of content across versions of stimulus materials.

Recording Medium for the Oral Versions

There are two usual means of recording spoken language, sound tape recording and videotape recording. Videotape recording was chosen in order to preserve the visual channel. The presence of non-verbal elements of a communication in which the speaker is visible to the listener is one of the important differences between the two types of communication situation being compared in this study. The spontaneous oral discussions were recorded on videotape, and the stimulus materials were presented by means of videotape playback equipment.

Source of the Oral Versions

A third dimension of difference in language production is

the person who speaks or writes. Obviously children's speech differs from that of adults, and it seems reasonable to suppose that adults who are practised speakers, such as radio and television announcers, produce spoken language that is more fluent and polished than people who do not have the same training and experience.

Very early in the planning of the study, the use of professionally produced material from extant television programs was considered. However, the choice of suitable materials in the argument mode was very limited. In the first place it is considered poor use of the medium to have a static camera focused on a speaker, or on several participants in a discussion. Since it was planned to produce a written version of each oral text used, any information other than that conveyed by speech would be very difficult to include in the written versions. Hence some otherwise suitable television material was disqualified from possible use by the inclusion of additional visual information to supplement the spoken content. Secondly it is often unclear what kind of preparation and rehearsal has gone into a finished television production, and, therefore, how spontaneous the language is. Finally, if material from a regular television program were used, there would always be the risk that some of the subjects in the study might have seen the program, thus contaminating the data. For these reasons the use of professionally produced material was rejected.

The alternative to using extant materials was to produce them specifically for the purposes of the study. It had been decided that the experimental samples would consist of grade eleven

students. Since peer group speech could be assumed to constitute a significant proportion of the language environment of any student group, the speech of other grade eleven students was an appropriate target of comparative study. Consequently grade eleven students were chosen as the source of the oral materials. To ensure good quality speech and argument, only students identified as articulate were employed in this production. Thus, this dimension of the definition of the oral language involved in the study was achieved by the use of articulate grade eleven students as the source of the spoken language register.

User-Medium Relationship

This term was used by Gregory (1967) to describe the category of variation which results from the choice which a language user has of different forms of language expression. Figure IV-1, adapted from Gregory (1967, p. 189), shows these choices.

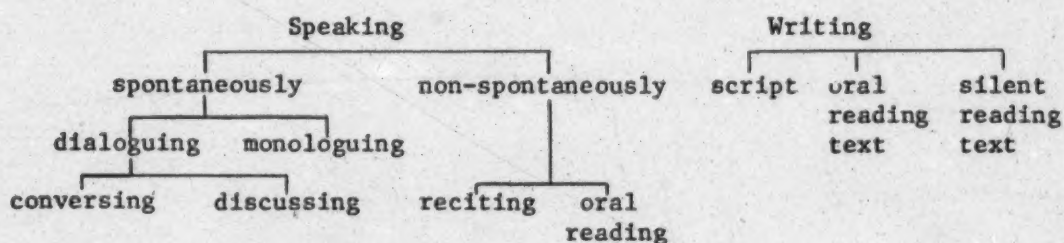


Fig. IV-1.-Varieties of forms of language expression
(Adapted from Gregory, 1967, p. 189).

Figure IV-1 shows that if a person wished to present an argument, he would have the choice of either speech or writing. Within speech he would have the choice of speaking spontaneously or non-spontaneously, and, if he chose the former, he would be faced

with the alternative forms of conversation, discussion, or monologue. If he chose a non-spontaneous form of speech, he would use either recitation or a written text which he would read aloud. Writing, on the other hand, would offer three alternative forms: a script (to be spoken as if not written), a text to be read aloud, and a text to be read silently. Each different alternative would, if properly deployed, produce a different type of language.

Since the purpose of this study was to carry out a comparison between the processing of spontaneous oral language and formal written language, a choice of one spoken form and one written form had to be made. The purpose of the study dictated the choice of the "written to be read silently" alternative as the written form since silent reading was one target of study. There were three forms of spontaneous speech to choose from. All three, conversation, discussion, and monologue, would seem to represent frequently occurring types in the language environment of adolescents, and would, therefore be legitimate registers to examine. Conversation was excluded because it would have been difficult to prepare a formal written version that was equivalent in content to the spoken original. The choice between monologue and discussion was made following a pilot study in which monologues were videotaped.

Three students, identified by one of their teachers as verbal and articulate, were invited to participate in a videotaping session. Each student was asked to present a five-minute argument on a topic of his own choice. With minimum preparation, several such monologues were recorded. However, it seemed that,

in spite of the speaking ability of the students, the results were rather flat and not very compelling. It seemed as though more vivacity and poise were needed to dominate the television screen. Monologue was, therefore, considered to be unsuitable when the source of the oral materials was to be grade eleven students. The remaining alternative was discussion and this was the one chosen as the format for the oral language that was the other target of the study.

Thus, the spoken register of language involved could be defined as argument in the form of spontaneous oral discussion produced by articulate grade eleven students and recorded on videotape. The written register involved in the comparison was formal writing produced by the investigator using the same topic and information as the oral versions.

The Population

The aim of the study was to compare listening and reading in their relatively mature forms rather than in the early stages of their development. Grade twelve students might have represented the best source of subjects in this respect, but the final year of high school involves a heavier load of examinations and other pressures. In view of this, it was decided that it was more practicable to use a grade eleven population.

The sample population was drawn from three urban high schools made available by the Edmonton Catholic School Board. In each school the Head of the English Department selected three English 20 classes to participate in the study and it was from these

grade eleven classes, nine in all, that the experimental samples were drawn. Table IV-1 summarizes the relevant information about the three participating schools.

Table IV-1
Characteristics of the Three Participating Schools

School	Total enrolment March, 1972	Total English 20 students	Demographic area served
A	1500	391	Lower and Lower Middle class
B	2100	147	Inner City
C	900	201	Middle Class

English 20 is an integrated Language and Literature course for grade eleven students. It is not a compulsory course and is open to both Matriculation and Diploma students. Matriculation refers to the program taken by students who plan to go on to university, while the Diploma program is designed for students who will not be continuing their formal education beyond high school. Apart from Vocational students who would not take English 20, the population represented the full range of ability present in the Matriculation and Diploma programs of the three schools.

School B followed a two-semester year, the first semester ending on January 31. Thus, for that school, the number of students enrolled in English 20 shown in Table IV-1, 147, was the figure for the second semester during which the data collection took place.

In the other two schools, English 20 was a full-year course and the figures shown represent the enrolment in that course as of September, 1971.

In each school there was a number of bilingual students whose native language was not English. It was felt that the presence of these students, whose command of English varied, might have exerted some unknown influence upon the results of a comparative study of listening and reading. In the course of data collection these students were identified and excluded from the final experimental samples. The method of identification was to ask the students in each class to answer three questions related to their language, backgrounds. These questions were:

1. In which country were you born?
2. What do you consider to be your native language?
3. In which language would family, supper time conversations normally be conducted?

Any student whose answer to Question One was a non-English-speaking country or whose answer to either of the other two questions was a language other than English was excluded from the experimental samples.

The Administration of Standardized Tests of Reading and Listening Ability

The identification and grouping of the experimental samples in this phase depended upon scores from a standardized reading test and a standardized listening test. Prior to the execution of the

recall task, two tests were administered to each of the nine grade eleven classes involved. The test selected were the Cooperative Test of Reading Comprehension, Form 2B, and the Sequential Tests of Educational Progress Listening Test, Form 2A.

The Cooperative Test of Reading Comprehension consists of a word knowledge and a comprehension subtest. The material in the comprehension subtest covers a wide range of written material, including factual, anecdotal, and humorous selections. Similarly a wide range of literal and interpretive comprehension skills is measured by the multiple choice questions. The scores from the two sixty-item subtests were combined to give a total reading raw score which was used as the measure of reading comprehension ability.

In the area of listening measurement there are only two standardized tests of verbal listening ability available, the Brown-Carlson Listening Test and the STEP Listening Test. The first of these measures a variety of different facets of listening ability including, for example, auditory memory for digits. Only one of the five subtests measures the ability to comprehend lecture-type material. This test was not really suitable for the purposes of this study, where the emphasis was solely upon the processing of verbal material.

The STEP Listening Test, which takes ninety minutes to administer, has two equivalent parts. Each contains short selections of varied prose and verse material. These selections are read aloud by the examiner and each selection is followed by a set of multiple choice questions also read aloud. The student selects the appropriate response to each question from a list of distractors

which he reads while the examiner reads them aloud. The questions require recall of details and main ideas and the making of inferences about the content and structure of the selections. Since all the selections were written material that was read aloud, the registers of language involved in this test were not the same as that which was the target of study, spontaneous spoken language.

This test was administered at one sitting to the classes in School A and C with a break between the two parts. In School B the administration of each part took place on two separate days within the same week. The subject's total raw score was used as the measure of listening ability.

The Experimental Samples

The design of Phase Two called for forty-eight subjects from each school to be divided into two groups, one group being exposed to a written version of one stimulus passage and the other to the corresponding oral version.

Those students who were native speakers of English were ranked on the basis of their standardized reading test scores and again on the basis of the standardized listening test scores. Each ranked list was then divided into approximately equal thirds. For each school this produced three reading levels: high, middle and low; and three listening levels: high, middle and low. Thus, each student in the sample belonged to two levels, a reading level and a listening level.

The next step was to assign the subjects to either a listening

treatment group or a reading treatment group. The aim of this grouping procedure was to produce two groups stratified according to reading and listening levels. Ideally the same twenty-four subjects in each treatment group would be cross-classifiable to produce eight per cell for both reading and listening levels. The group of twenty-four would contain eight of each reading level as well as eight of each listening level, even though, for example, the eight High Readers would not have to be the same subjects as the eight High Listeners.

To achieve this grouping, each student from one school identified as a High Reader was randomly assigned to one of the two treatment groups. Then those identified as Middle Readers were similarly assigned to the same groups, followed by the Low Readers. In this way two groups were formed which were stratified into three reading levels. Since the same subjects had also been assigned to listening levels, the two groups were stratified according to three levels of listening ability too. From these groups subjects were randomly selected to produce the final treatment groups. Upon completion of the written recall task, a random selection was made from the available reading group texts to produce a minimum of eight subjects classified as High Readers, eight as Middle Readers and eight as Low Readers. The same procedure produced a similar composition for the Listening group. A check was then made on the composition of each group with regard to numbers of subjects representing the three listening levels. Additional available texts were randomly selected in cases where

there was not a minimum of eight subjects per level.

In the case of School A the elimination of non-native English speakers severely reduced the size of the sample and there were not enough subjects of each reading and listening level to provide eight per cell. For this school the number was reduced to seven per cell.

For School A group sizes of twenty-four and twenty-three were required to produce seven subjects at each level of reading and seven at each level of listening. For School B the same twenty-four subjects in each group were cross-classifiable into eight at each level of reading and listening. For School C one additional subject had to be added to the listening group to produce the requisite cell size of eight in both classifications.

The samples from the three schools were independent of each other. No pooling of data was possible because a different stimulus passage was used with each one.

The Production and Preparation of the Stimulus Materials

The objective was to obtain two versions of discussions, a spontaneous spoken version and a written version. The strategy followed was to produce the oral discussion first and, working from this, to prepare the written version, keeping as close as possible to the same informational content. An earlier attempt to produce simulated spontaneous spoken material using a formal written version as the base did not result in appropriate oral language. It was the opinion of the investigator and of a group of graduate student

colleagues that the oral version produced in this way was artificial and unrepresentative of spontaneous speech. Since writing is a more deliberate, reflective form of expression than speaking, there would seem to be less danger of the written expression being influenced by the spoken forms if the written were based on the spoken rather than vice versa.

The Production of the Oral Discussions

Five students were invited to participate in a recording session. Three were the students who had earlier taken part in the production of monologues, and two were students from the group which had participated in the production of speech and writing samples for Phase One. They were invited because they had demonstrated the ability to present an argument in a mature fashion. This group of five grade eleven students consisted of four boys and one girl.

A Sony Half-Inch New Format Videocamera and Sony 3600 recording equipment were set up in a classroom at the university. The students were told the purpose of the session and asked to choose a topic about which they felt confident to speak in a simulated interview situation. The students were instructed to work in pairs, one partner acting as a speaker with a particular point of view about the topic chosen and the other taking on the role of interviewer. It was suggested that the topic be cast in the form of a question and that the purpose of the discussion would be to allow the speaker to present his answer to the question together with supporting facts and arguments. They were to imagine an

audience of other grade eleven students. The role of the interviewer was to be that of an unobtrusive facilitator of the discussion. It was suggested that the discussion start with the interviewer introducing the speaker and the topic. Only a small card was allowed for brief notes and in all cases the interviewer was the only one who used it.

A few minutes were allowed for each speaker to consult with the student who was to act as his interviewer and then they were seated before the camera and their discussion was videotaped. Four of the students each acted as speaker once and the fifth student took on the role twice with different topics. In this way one three-hour session produced a total of six videotaped discussions of from five to ten minutes in length.

The Preparation of the Oral Versions

The six discussions were then studied repeatedly in both videotape and transcribed form. Some discussions were longer than the desired five or six minutes of running time. These were reduced to an appropriate length by selecting a cut-off point at the end of an answer to a question which exhausted that aspect of the topic. In this form all six discussions were dubbed onto a separate videotape of the same format. A one-minute interval of blank running tape was interposed between each discussion.

It was decided that three discussions would be used. Consequently a selection was made of those three discussions which best met criteria of visual and auditory technical quality, interest

of content, and quality of argument. The three selected were:

1. Is the Standard of Professional Hockey Declining?
2. Should Taiwan have been Expelled from the United Nations?
3. Are Facilities for the Treatment of Mental Illness Adequate?

From this point these discussions will be referred to as the "Hockey Passage", the "United Nations Passage" and the "Mental Illness Passage" respectively (Appendix C).

In their final videotape form each discussion was preceded by several seconds of blank screen with an abrupt start to the discussion itself. Each discussion also ended rather abruptly. No titles or other information was added to the videotapes.

The Preparation of the Written Versions

A written version of each discussion was prepared using the transcripts of the oral versions as a base. In the written versions the question and answer format was retained and a title was added. The writing was done very carefully. First of all the transcripts were examined and any extraneous material like mazes, audible pauses, and fillers, was marked. Each question and answer was separately broken down into points and any ambiguities were resolved as far as possible by reference to the original videotape. By this time the content of each discussion was very familiar to the writer. Each question and each answer was then cast into written form, as far as possible using the natural style of the writer to achieve coherent, clear sentences. Several revisions and checks were made to ensure that, in the opinion of the writer, the informational content of

the written and spoken versions was essentially the same. The written versions are contained in Appendix D.

Descriptive Characteristics of the Oral and
Written Versions of the Three Stimulus
Passages

In their final form the two versions of each passage were analyzed in order to derive some descriptive data about them for comparison purposes. These data related to length, and syntactic structure as revealed by T-unit analysis. The amount of extraneous material in the three oral versions was also tallied as were certain aspects of readability as measured by the Dale-Chall Readability Formula (Dale and Chall, 1948). Finally, the rate of delivery of each oral version was determined. The results of this analysis are presented in Table IV-2. These data were relevant to a consideration of how the written versions differed from the oral ones, and could be compared in this respect to the findings of the pilot study. They were also relevant to the question of how one passage differed from another. In this sense any differences could be related to the findings of the data analysis.

Table IV-2 shows that all three written versions were shorter in terms of words and response units than the corresponding oral versions. In the case of the Mental Illness Passage the average length of written T-units was greater than that of the oral ones; while the oral T-units were on the average longer in the case of the other two passages. There appeared to be a wider range in the length of oral T-units, with more short and more

TABLE IV-2

DESCRIPTIVE CHARACTERISTICS OF THE ORAL AND WRITTEN
VERSIONS OF THE THREE STIMULUS PASSAGES

Characteristic	Passage					
	Hockey		United Nations		Mental Illness	
	Oral	Written	Oral	Written	Oral	Written
Number of words	778	712	787	688	764	689
Number of T-units	48	48	47	44	57	45
Mean length of T-unit	16.2	14.8	16.8	15.6	13.4	15.3
T-unit range						
Short	10	8	13	7	17	7
Medium short	27	33	18	24	31	27
Medium long	8	6	11	13	8	10
Long	3	1	5	0	1	1
Response units	80	70	67	57	93	76
Extraneous material						
Audible pauses	12		30		30	
Mazes	10		13		22	
Maze words	20		38		48	
Filler words	11		4		8	
Readability level						
Unfamiliar words	111	160	117	138	122	163
Dale score	14.4	22.5	14.9	20	16.0	23.7
Mean sentence length		17		18.1		17.2
Readability score		8.0		7.7		8.2
Grade level		11-12		9-10		11-12
Speaking rate						
Running time (mins)	4.83		6.37		6.22	
Delivery rate (wpm)	167		130		132	

long ones than in the written versions.

The Hockey Passage contained less extraneous material than the other two and it was delivered at a faster rate. This could be an indication that the speaker in this discussion was more fluent in his delivery than the other speakers.

Full readability data were presented only for the written versions since the Dale-Chall Readability Formula, like any other, can not be applied to spoken language because of the difficulty of establishing sentence boundaries. The readability scores for the three written versions were quite consistent although that of the United Nations Passage fell just below the line between the two grade level designations. This put this version at a grade nine to ten level of difficulty, whereas the other two were at the grade eleven to twelve level. The Dale Scores, on the proportions of unfamiliar words, defined as those words not appearing on the Dale List of 30,000 Words, showed that the written versions contained a higher proportion of unfamiliar words than the oral versions. This was consistent with the findings of Horowitz and Newman (1964), Fraisse and Breyton (1959), and Driemann (1962) that the type-token ratio of written material was higher than that of spoken.

Pilot Studies Related to the Written Recall Task

At different points in the development of the written recall task, three pilot studies were carried out to test the feasibility of using such a technique in a regular classroom setting with both written and videotape materials. Another purpose was to develop

sets of instructions to precede the viewing or reading and the writing of the recalls.

Pilot Study One: The General Feasibility
of Written Recall

One grade eleven class in a school not involved in the main parts of the study was given a short passage to read and then asked to write down the ideas they could recall. This activity was supervised by their regular social studies teacher in the course of a class period. The outcomes of this pilot study were the resulting written recalls and reports of the students' reactions to the task. The recall texts were substantial and demonstrated distortion and importation phenomenon as well as accurately recalled ideas. It was obvious that the instructions following the reading were not explicit enough since, in some cases, there were some divergent interpretations of the requirements of the task. Some students wrote giving their reactions and impressions of the passage rather than attempting to recall its ideas. It was reported that the students were quite interested in the task and that they applied themselves diligently to the exercise.

On the basis of this pilot study it was decided that the technique of written recalls was feasible with grade eleven students, but that very explicit instructions were necessary.

Pilot Study Two: Developing Procedures for Carrying
out the Written Recall Task

After the videotape recording of the oral discussions, the selection of the three for use in the study, and the preparation of

the written versions of each of these three, a pilot study was carried out to check on the procedures for carrying out the task. Two undergraduate classes were used in this pilot study: one class viewed the videotape version of the Mental Illness discussion, and the other read the equivalent written version. Each class wrote recalls.

The exercise was discussed with each class. The consensus in each case was that the task was quite interesting and the videotape class felt that the quality of the discussion was adequate and the visual and auditory technical aspects of the videotape satisfactory. The nature of the instructions was discussed. In each case the students were not told what the task would be after reading or listening except that it would be an attempt to evaluate their comprehension of the material. The question was raised whether they thought it would be advisable to reveal the nature of the recall task prior to the reading or listening. Many students felt that this would change the nature of the listening and reading that would be done and that such reading or listening was not typical. Finally, the written recalls of the two groups were subjectively studied to see if there were any discernible differences. It was noticeable that those of the reading group were considerably longer on the average than those of the other group.

Pilot Study Three: Evaluation of the
Written Recall Task Procedures and
Instructions with a Grade Eleven Class

The class involved in this pilot study included the

fourteen students who had participated in the production of the oral and written discussions used in the major pilot study. This pilot study was part of a longer session with the class in which some of the findings of the Phase One analysis were presented and discussed.

The class carried out a written recall exercise in its planned final form. The videotape version of the Mental Illness discussion was used since the speakers in the other two discussions were members of this class.

The instructions were read out to the class and the students then watched the videotape displayed on a television monitor. The task instructions were then distributed and read out and the recalls were written. Following the writing of the recalls, the students were asked to write comments about the clarity and explicitness of the two sets of instructions. All students who responded to this wrote that they found them to be clear and understandable. These instructions were unchanged for the final data collection and are included in Appendix E.

The written recalls of these students were examined to see if the highly structured nature of the task caused by the instructions had possibly resulted in an undesirable homogeneity of response. It was found that although the students had all carried out the demands of the task quite closely there was considerable variability in their recall texts in respect to length, number of accurately recalled ideas and types of distortions and importations. On this basis and on the basis of the students' positive comments, these instructions were felt

to be suitable for use in the collection of the data.

The Collection of the Written Recalls

The written recalls were collected from each class separately in the course of one English 20 period, or block. The videotape playback equipment, consisting of a Sony 3600 Videocorder and a Sony eleven inch television monitor, was set up in a classroom made available by the school. Seats were arranged so that each subject would have an unimpeded view of the monitor and be near enough to see and hear clearly.

A detailed set of step-by-step instructions had been prepared for each class teacher who assisted in the supervision of the groups. These were explained to each teacher during the few minutes at the beginning of the block concerned while the students were assembling. The general procedures were then outlined to the class as a whole and then each student was told which of the two groups he belonged to. In all cases the teacher supervised the reading group and the investigator was in charge of the listening group. The materials for the reading group, written version copies, copies of instructions and answer papers, were left with the supervising teacher while the listening group was taken to the room where the videotape playback equipment had been set up. There they were seated around the monitor. The size of this group varied from class to class and ranged between five and twelve.

A set of instructions was read aloud while each student followed his own copy. These instructions told them the purpose

of the exercise and the format of what they would see. They were told to concentrate on the speaker's views and the way in which he supported them with facts, information and arguments. They were informed that after the viewing they would be given a task designed to reveal their understanding of the views and arguments presented. One purpose of the instructions was to give the subjects a definite, clear-cut objective for listening. A parallel set of instructions was used with the reading group so that their orientation and purpose was, as similar as possible.

For the listening group the videotaped discussion was then played through once without further comment. At the end of the discussion the machine was switched off and a second set of instructions was distributed and read aloud. These instructions, exactly the same as those used by the reading group after they had read through the written version, asked the students to write down everything they could remember of what the speaker had said. A blank sheet of paper was given to each student as an answer sheet. No time limit on the writing was imposed. Almost all students were finished within twenty minutes both in the listening and the reading groups.

The two groups from each class carried out the task at the same time in different rooms. Conditions were kept as equivalent as possible through the instructions given and the time made available. However, no controls were placed on the time for reading the written version. The reading group was asked to read it through once only at their normal reading speed and then to turn the paper

over. Some students finished the reading in as little as two and a half to three minutes; others took longer. No attempts were made to keep the time for listening and reading the same, since this is one of the natural differences between the two activities. In all cases the supervising teacher reported that the administration of the reading and recall task had been carried out smoothly and uneventfully.

From the subjects of each reading and listening level who had carried out the task a random selection was made to fill each of the cells in the two groups. Where cells did not reach the required number, return visits were made to the schools in question to administer the task to those students who had been absent from school for the first administration. The investigator administered both tasks separately to the students involved who were drawn from their regular classes.

The written recalls of those subjects in the final sample were typed up on specially prepared outline sheets, each with an identifying number and the reading and listening levels and raw scores shown on it. The recalls were typed verbatim except that spelling was conventionalized. Sentences were numbered and spaced to facilitate later analysis.

The Analysis of the Written Recall Texts

The purpose of the analysis was to develop post hoc ways of identifying and quantifying phenomena in the recall texts that reflected the processing of the spoken and written stimulus materials

and that related to the research question. The two treatments could then be compared objectively to see if they differed in respect to the variation of interpretation.

The first step in the analysis was to take a small number of recall texts from each group and to make several preliminary analyses comparing them with the contents of the discussion texts on which they were based. This preliminary analysis revealed that the recall texts generally contained seven different types of statements or ideas:

1. Attempts to express, with varying degrees of accuracy, explicitly stated ideas from the original discussion text.
2. Attempts to express what were inferences, implications, assumptions or unstated conclusions in the original text.
3. Imported ideas that were congruent, or consistent, with the content of the original discussion.
4. Imported ideas that were incongruent, or inconsistent, with the content of the original discussion.
5. Repeated ideas which were restatements of ideas already included in the recall text.
6. Descriptive comments about the interview situation and about the topic of the discussion.
7. Evaluative comments about the interview situation and about the ideas of the speaker and interviewer.

In terms of the purposes of the study and in terms of the instructions given the students preceding the writing of the recalls, material of Types Six and Seven, descriptive and evaluative

comments, was considered irrelevant. These types of material in the recall texts, constituting a very small proportion of the written recalls, were excluded from any further analyses. Similarly material of Type Five, repeated ideas, was not considered particularly significant. The remaining four types of material formed the basis for the categorization which was developed.

The question guiding the study at this point was whether the processing of spontaneous speech by listeners exhibited greater variability of interpretation than the processing of formal writing by readers. The objective of the analysis was to develop a set of categories which would permit the examination of the recall of explicitly stated ideas and of the three types of imported material in a way that would address this question.

Two aspects of the variability of interpretation could be derived from the analysis of the recall of explicitly stated ideas: the deviation in meaning between the ideas recalled and the equivalent ideas in the original discussion; and secondly the ways in which recalled ideas were related to other information. In other words, perfect interpretation would be shown by recall of all the original ideas without change of meaning and without changes in the relationships among them. Variable interpretation would be shown either by changes of meaning or changes in the relationships between the recalled ideas and other information. In recall of argumentative discourse this latter aspect would be particularly significant because of the importance of the logical network of supporting facts and arguments in the overall meaning of the text.

Analysis of the imported material could also be related to the research question. Variability of interpretation would be revealed by the amount of new information brought in from outside the discussion, especially new information that was not consistent with the content of the discussion. The more new information that was imported into the written recall the greater would have been the variability in the processing of the discussion text.

A complex set of categories was developed that would allow these phenomena related to variability of interpretation to be quantified for each treatment's recall texts. This would then permit comparisons to be made between the two treatments. These comparisons were guided by more specific hypotheses which were subsumed under the general research question. However, before the testing of these hypotheses can be reported it is necessary to give an account of the development of the categories for the analysis of the written recall texts. (A more complete description of the analysis procedures is contained in Appendix G.)

Categories Describing Attempts to Express Explicitly Stated Original Ideas

The significant steps in the speaker's argument, or the significant points that he made in the course of his answers to the interviewer's questions, were listed for each of the three original discussion passages. Because the written versions had been derived from the oral ones, the same list of original ideas applied equally well to both versions of a particular discussion.

Any information contributed by the interviewer was not included, except in cases where the speaker's answer depended on this information if it was to be understood. In cases like this the information was incorporated into the first point made in the speaker's answer to that particular question. (These lists are shown in Appendix F.)

Recalled ideas. Each written recall text was then examined and whenever one of the original ideas on the prepared list was encountered it was marked on a specially prepared analysis sheet, one for each recall text. These identified original ideas were called recalled ideas.

A recalled idea was defined as a discernible attempt to express an idea listed as an explicitly stated original idea. For purposes of analysis this definition was made more operational and a full description of this operational definition is given in Appendix G.

Relationships demonstrated by recalled ideas. The second step in the analysis was to examine the way the written recalls expressed relationships between the recalled ideas and the rest of the written text. The texts revealed three general ways in which a recalled idea could be related to other ideas. It could be expressed in a way that showed it was related to the discussion in much the same way as in the original text; it could be expressed in such a way that it had a different relationship; or it could be expressed as an isolated idea with no attempt to relate it to

other ideas.

Three operationally defined categories were set up in an attempt to capture these three types of relationships. Each recalled idea was allocated to one of these categories. They were labelled: Appropriate Relationship, Inappropriate Relationship, and Absence of Relationship.

These three relationships were difficult to define objectively. In order to achieve some measure of objectivity, the lists of original explicitly stated ideas were divided into "discussion components." A discussion component was that part of the discussion which dealt with one aspect of the topic. In most cases this was defined by the answer the speaker gave to one of the interviewer's questions. That is a discussion component consisted of all the original ideas which constituted the answer to one question. However, in cases where two questions were closely related their answers were combined to form a single discussion component.

In order to be classified as appropriately related, a recalled idea had to be expressed in a way which showed it to be related to material derived from the same discussion component, either another recalled idea or imported material related to it. An inappropriate relationship was indicated by a recalled idea being related to material from another discussion component.

Distorted recalled ideas. Most recalled ideas were expressed in paraphrase form. Consequently, not only was the

expression different in many cases, but the meaning was also changed. The original idea was still discernible but the meaning had undergone some transformation. This step in the analysis attempted to differentiate several different ways in which the meaning of an original idea had been transformed in its expression in the written recall. Examination of the written recalls revealed three definable types of meaning transformations and a residual type to which no definition could be given. Thus four categories of distorted recalled ideas were established.

The first involved a significant change of meaning due to the substitution of a key word, that is when a key word from the original idea was replaced in the recalled version by a different word. For example, in one text the original idea: (U.N.B13) "This would have upset the balance of power" was expressed as:

This would have upset the balance of ideologies.

The second category of distortions resulted from the widening or narrowing of the domain of application of an idea. For example the speaker in the Hockey Discussion stated that: (H.A1) "The standard of hockey in the NHL has declined." In this case the domain of application of the idea that there had been a decline in the standard of hockey was that part of the game, hockey, encompassed by the National Hockey League. In many written recalls this idea was expressed more generally as:

The standard of hockey has declined.

The domain of application of the idea had been widened to include the whole sport. The same phenomenon was demonstrated when an

original idea such as: (M.I.A6) "There are not enough psychiatrists for the number of patients" was recalled as:

There are not enough doctors.

or as:

These institutions are understaffed.

The recalled ideas extended the domain of application beyond the subset of doctors or institutional staff, namely those doctors or staff who were psychiatrists, to include doctors generally in one case, and staff generally in the other.

This category took precedence over Category One in the sense that if a key word substitution produced a change of domain of application, it was counted as Category Two and not Category One.

Distortion Category Three involved changes in precision. It included examples where the recalled ideas was more or less vague than the original, more or less definite, or less complete. It also included inaccurate recalls in the sense of a precise term or quantity in the original being recalled as a precise but different term or quantity. For example the original idea (U.N.A4) Communist China has a population of about 750 million was recalled as:

China's population is 570 million.

This was a Category Three distortion because it was an inaccurately recalled idea.

Distortion Category Four, a residual category, consisted of those recalled ideas that were distorted but which did not

belong to one of the three definable categories. This was a somewhat heterogenous class of distortions to which no consistent label could be attached. For example the original idea: (U.N.A7) Communist China did not want to join the United Nations as long as Taiwan was a member was, in one text, recalled as:

China would not join the U.N. if Taiwan joined too.

The writer seemed to have failed to appreciate the true state of affairs to which the original idea referred. Consequently the recalled idea was distorted but not in a way which would have allocated it to one of the defined categories of distortion. Cases like this were placed in the residual category.

All of the recalled ideas were identified either as distorted or non-distorted and the former were further allocated to one of the four categories of distortion.

Categories Describing Imported Material

In the analysis of recalled ideas the units of analysis were identified in the original discussion text. These were the explicitly stated original ideas. It was not necessary to identify a recalled idea as a unit in the recall text: it could be a phrase or a sentence or a group of phrases or sentences. However, in the case of imported material, by definition new material and therefore not present in the original discussions, units of analysis had to be identified in the recall texts so that the incidence of imported ideas could be measured.

Response units. The unit chosen was called a "response

unit" following the terminology of Squire (1964). Essentially this was the smallest number of words that expressed a thought or idea. A detailed set of definitive characteristics of response units was drawn up bearing in mind the fact that the mode of discourse involved was argument. A response unit was an attempt to identify the components of argumentative discourse, the propositional statements which compose the network of argument statements, reasons and conclusions. For example, the following passage contains four response units as shown by the slashed lines:

The hospitals are archaic/ with too few psychiatrists
for the number of patients./ Because of their large
size,/ they are too impersonal./

In order to segment the written texts into response units a much fuller definition had to be developed to cope with the complexities of expression found in natural language text. The complete set of operational descriptions is given in Appendix G.

Imported response units. Having segmented each written recall text into response units, those units which were importations, were identified and marked. These were response units that were statements or parts of statements that the writer of the recall apparently intended to represent ideas from the original discussion. However, these response units could not be matched with ideas or information in the discussion text, and they were called "importations" after Bartlett (1932).

This class of response units consisted of three of the types of material identified in the preliminary analysis:

attempts to express what were inferences, implications, assumptions or unstated conclusions in the original discussion text,

imported ideas that were congruent, or consistent, with the content of the original discussion,

and imported ideas that were incongruent, or inconsistent, with the content of the original discussion.

These formed three categories of imported response units.

Category One, logical inferences, could be considered as part of the "meaning" of the discussion obtained, one could perhaps say, from reading or listening between the lines. There would be no doubt that the original speaker would have agreed with the imported idea constituted in whole or in part by the response unit.

Examples:

But the United States attempt to repel Communist China failed. In the discussion the speaker referred to the opposition to Communist China's membership of the United Nations, but did not explicitly state that the opposition failed. However, the example above was a valid inference based on the information given earlier that Communist China had taken the place of Taiwan in the United Nations.

He also said that there is a great demand for hockey players. In this discussion the speaker attributed the decline in quality of NHL hockey to the increased number of teams and said that there were not enough top-quality players to go around. He did not

explicitly state that the demand for players had increased, but it was obvious that this is what he meant.

The second type of imported response unit contained new information that was not logically or necessarily true based on the actual discussion text, but which was quite compatible or consistent with it. This was new information that was derived from sources of information other than the discussion text. It could be said to have represented information that was part of the listener or reader's background knowledge that he brought to the listening or reading situation involved in this phase of the study. Being compatible with the ideas presented in the discussion, it was information which the original speaker might have agreed with but there was no evidence from the discussion itself to suggest that he undoubtedly would.

Examples:

And the morale is starting to sink on the team.

The speaker discussed the decline in standard but at no time referred to player morale. However, if the quality of play was declining, a drop in morale would be quite consistent with that.

He also said that in other cases when a person just once acts rather abnormal he becomes a patient in a mental institution.

This was not referred to at all in the discussions. The information was derived from a completely different source. Yet, there is nothing in the original discussion which it contradicts, so it is classified as a consistent imported response unit by default, in a sense, since it is not apparently inconsistent.

The third type of imported response unit contained new information that was incompatible or inconsistent with the original discussion content. It was contradictory or illogical given what the speaker said. It was information that the speaker would most certainly have disagreed with.

Examples:

He mentioned that there is a lot of progress going on regarding the mental institutions.

The general argument of the discussion was that facilities for the treatment of mental illness were inadequate. The speaker admitted that in certain areas progress had been made but that it was slow progress. The response unit above appeared to be contradictory and inconsistent.

He also felt that China was already a great world power. The speaker had said that China was potentially a world power and that joining the U.N. would be one way to develop this potential. The above response unit appeared to be incompatible with these statements.

These three categories of importation could be said to have varied along a continuum of correctness as far as being attempts to present ideas recalled from the listening and reading task. Category One importations was undoubtedly correct as representations of the speaker's ideas. Those of Category Two were reasonable ideas. Category Three contained material that was definitely incorrect as far as the task was concerned.

Summary of Definitions Related the Analysis
of the Written Recalls

1.1 Discussion Component was that part of an original discussion text which constituted the speaker's answer to one question or to more than one closely related question. They have a letter designation on the lists of original ideas shown in Appendix F.

2.1 Recalled Idea was an explicit original idea that was discernible in the written recall, either retaining essentially the same meaning or distorted.

3.0 Relationships Demonstrated by Recalled Ideas

3.1 Appropriate Relationship a recalled idea demonstrated an appropriate relationship if it was presented with evidence of awareness of its place in the discussion. This evidence was:

1. association with (adjacent to with links) another recalled idea from the same discussion component
2. association with an appropriate importation (one that was either a valid inference, assumption or conclusion).
3. explicit statement of its role.

3.2 Absence of Relationship a recalled idea demonstrated absence of relationship if it was presented with no evidence of relationship with any other idea whatever, nor with any explicit indication of its role in the discussion.

3.3 Inappropriate Relationship a recalled idea demonstrated an inappropriate relationship if it was presented with evidence that it had been assigned a role in the discussion that was not appropriate. This evidence was:

1. association with a recalled idea from another discussion component
2. association with an inappropriate importation
3. . explicit statement of an inappropriate role
4. any other indication of an inappropriate role.

4.0 Distorted Recalled Idea was a recalled idea whose meaning was significantly changed from the meaning of the original idea from which it had been derived.

4.1 Category One Distorted Recalled Idea was a recalled idea whose meaning was significantly changed from that of its source through the substitution of a key word.

4.2 Category Two Distorted Recalled Idea was a recalled idea whose meaning was significantly changed from that of its source through an extension or narrowing of its domain of application.

4.3 Category Three Distorted Recalled Idea was a recalled idea whose meaning was significantly changed from that of its source through the use of a different level of precision.

4.4 Category Four Distorted Recalled Idea was a recalled idea whose meaning was significantly changed from that of its source but which did not clearly belong to any of the other three defined categories of distortion.

5.1 Response Unit was the smallest number of words that constituted a complete thought. It was either expressed as a complete statement, or it was linguistically abbreviated as part of another statement.

6.0 Imported Response Unit was an idea apparently intended as a recalled idea by the writer of the recall which was not directly

derived from an explicitly stated original idea.

6.1 Category One Importation was an imported response unit that was a valid inference, assumption, or conclusion from the original discussion. Its meaning followed logically from the information given in the discussion.

6.2 Category Two Importation was an imported response unit that was new information not derived from the discussion text but which was consistent with it.

6.3 Category Three Importation was an imported response unit that was not derived from the original discussion text and which was not consistent with it.

The Reliability of the Analysis of the Written Recall Texts

The analysis of the written recall texts involved a high degree of subjectivity. The definitions of phenomena such as recalled ideas, appropriate relationship among recalled ideas, distortions and importations could not be operationalized to the point where their application was simply a mechanical process of identification and allocation. In view of this the reliability of the several analytical procedures was crucial to the study.

Two judges, both university graduates, participated in training sessions to learn the categories. They then analyzed a sample of the recalled texts according to the definitions provided. The formalized training procedure to teach the categories and the methods of analysis is shown in modified form

in Appendix G. Each judge was involved for approximately twelve hours in the learning and application of the procedures.

Of the total 144 written recall texts, thirty were used as sources of material to be analyzed by the judges. Every fifth text was taken from the listening and the reading group from each school. This yielded five representative written recalls from each group, a total of ten from each school. In cases where there were less than twenty-five subjects in a group the last subject in the group was taken as the fifth sample.

The check on the segmentation of the written recalls was an exception to this general procedure. It was carried out much earlier in the development of the analyses than the other checks and it involved only one of the judges. However, in this case the entire thirty recall texts in the sample were segmented by the judge, which involved a total of 633 response units.

Table IV-3 shows the results of the reliability checks. The results are expressed as the percentage of agreement between each judge and the investigator on the several analyses carried out.

TABLE IV-3

PERCENTAGE OF AGREEMENT BETWEEN THE INVESTIGATOR AND
EACH OF TWO JUDGES IN THE ANALYSIS OF SAMPLES
OF THE WRITTEN RECALL TEXTS

Analysis	Number of items Analyzed	Percentage of Agreement with Judge A	Percentage of Agreement with Judge B	Mean
Recalled Ideas	30 sentences	76.7	80	78.3
Relationships among Recalled Ideas	30 recalled ideas	83.3	86.7	85
Distorted Recalled Ideas	30 recalled ideas	80	76.6	78.3
Categories of Distorted Recalled Ideas	26 distorted recalled ideas	88.5	88.5	88.5
Response Units	30 recall tests	-	90.3	-
Imported Response Units	30 response units	76.6	83.3	80
Categories of Imported Response Units	30 imported response units	70	66.6	68.3

Table IV-3 shows the number of items which each judge analyzed in each case. These items were randomly selected from the thirty sample texts except in the case of the response unit segmentation where the entire thirty texts were segmented by the one judge involved. For the first analysis, the identification of recalled ideas, one sentence from each of the thirty sample texts was randomly selected and the judges were asked to identify any recalled ideas

it contained. The analyses involving relationships among recalled ideas and distorted recalled ideas were carried out using one randomly selected recalled idea from each sample text. Only twenty-six recalled ideas were involved in the categorization of distorted recalled ideas because four of the sample texts did not contain any recalled ideas that were distorted. The two analyses of importations employed randomly selected response units, one from each text. In the first, the judges were asked to identify those response units which were importations, and in the other to allocate each imported response unit to one of the three categories.

While the percentages of agreement shown in Table IV-3 were not high, they were deemed to be satisfactory in view of the difficulty involved in having the judges become familiar enough with the contents of the three discussions. This lack of familiarity made the allocation of each item an arduous process of checking through the discussion texts, whereas the investigator had been able by this stage to know the texts well. The mean percentages of agreement ranged between 68.3 and 88.5. This indicates that the category definitions retained a considerable element of subjectivity. It might have been possible to remove some this subjective element by making the definitions more rigorous and more mechanical. However, this would have meant imposing a rigidity upon them which might have resulted in considerable loss of meaning. It was necessary to strike a balance between undisciplined subjectivity and an objectivity that would have distorted the data.

The Statistical Analysis of the Data from the Written Recall Texts

The categorization of the written recall texts produced several scores for each subject in the two treatment groups:

1. Number of recalled ideas
2. Number of recalled ideas presented in an appropriate relationship
3. Number of recalled ideas presented in isolation
4. Number of ideas presented in an inappropriate relationship
5. Number of recalled ideas that were distorted
6. Number of recalled ideas that were not distorted
7. Number of Category One distorted recalled ideas
8. Number of Category Two distorted recalled ideas
9. Number of Category Three distorted recalled ideas
10. Number of Category Four distorted recalled ideas
11. Number of response units that were importations
12. Number of Category One imported response units
13. Number of Category Two imported response units
14. Number of Category Three imported response units
15. Number of words
16. Number of response units.

Hypotheses

The following hypotheses guided the statistical analysis of these scores:

- 1.0. There was no significant effects due to treatment, reading

levels or listening levels on the recall text scores on the following variables:

1.1. Number of words

1.2. Number of response units

1.3. Number of recalled ideas

1.4. Number of recalled ideas presented in an appropriate relationship

1.5. Number of recalled ideas that were not distorted

1.6. Percentage of recalled ideas presented in isolation

1.7. Percentage of recalled ideas presented in an inappropriate relationship

1.8. Percentage of response units that were importations

2.0. There were no significant effects due to treatment on the following variables:

2.1. Percentage of distorted recalled ideas that were Category One distortions

2.2. Percentage of distorted recalled ideas that were Category Two distortions

2.3. Percentage of distorted recalled ideas that were Category Three distortions

2.4. Percentage of distorted recalled ideas that were Category Four distortions

2.5. Percentage of response units that were Category One importations

2.6. Percentage of response units that were Category Two importations

2.7. Percentage of response units that were Category Three importations

2.8. Percentage of imported response units that were Category One importations

2.9. Percentage of imported response units that were Category Two importations

2.10. Percentage of imported response units that were Category Three importations.

Statistical Procedures

Hypotheses 1.1 through 1.8 were tested by two two-way analyses of variance. The first employed the factors, treatment x reading levels, and the second treatment x listening levels.

The results of the first two-way analysis of variance were used in testing the hypotheses related to treatment effects and reading level effects. Those of the second were used in testing the hypotheses related to listening level effects only.

Hypotheses 2.1 through 2.10 were tested by a z-test of the significance of differences between proportions (Ferguson, 1971, pp. 160-163).

Correlations were computed among the eight scores used as dependent variables in the analysis of variance tests and the reading and listening standardized test scores. A separate inter-correlation matrix was computed for each school separately, pooling the data from the listening and reading groups in each case.

All computer programs used in these analyses were made

available by the Division of Educational Research Services, Faculty of Education, University of Alberta. Computer facilities were provided by the Computing Services of the University of Alberta.

Summary

Mackworth (1971) wrote that "the word 'reading' can only be defined in terms of who is reading what in what state for what reason (pp. 8-67.)" The same could be said about listening. The two parts of this chapter giving details of the selection of the language registers and experimental subjects for the study were concerned with the definition of the 'what' and the 'who' of the two types of language performance under investigation. This was followed by an account of the preparation of the stimulus materials, both oral and written, to be presented to the experimental subjects. Then the details of three minor pilot studies related to the use of written recall as a research technique were given. An account was also given of the collection and analysis of the written recall texts and of the statistical procedures used to test the resulting data.

Chapter V will present the findings from the statistical analysis of these data. These findings referred to the comparison between the two sets of recall texts, those of the listening groups and those of the reading groups. The interpretation of these findings and a discussion of how they related to the research question and to the processes of listening and reading will be deferred until Chapter VII when conclusions drawn from the study will be discussed.

CHAPTER V

THE FINDINGS FROM THE ANALYSIS OF THE WRITTEN RECALL TEXTS IN PHASE TWO

Introduction

The findings reported in this chapter were the results of the statistical analyses of the data obtained from the classification of the material in the written recall texts. The statistical tests were carried out to determine whether there was a significant difference between the listening and the reading groups, and among the reading and listening levels, with respect to the several dependent variables derived from the recall texts.

These findings do not directly address the research question which was concerned with differences between the processes of listening and reading. The data presented in this chapter merely refer to the differences between the recall texts of groups of listeners and readers. Because of this the findings are presented without a discussion of their implications for the research question and for the theoretical issues raised in Chapter II. This vital task of interpretation is deferred until the final chapter when the conclusions are discussed in the form of an inferential argument attempting to account for the differences described in the present chapter.

The results of the analyses are presented separately for each school since no pooling of data across schools was possible.

School A used the Mental Illness Discussion; School B the United Nations Discussion; and School C the Hockey Discussion.

The hypotheses referred to the study as a whole so that if a significant difference was observed for all three schools on a particular dependent variable, that hypothesis was "strongly rejected." If a significant difference was found for only two of the three schools, the hypothesis was "tentatively rejected." If only one of the three schools revealed a significant difference, this was not considered sufficient grounds for the rejection of an hypothesis. In view of the replicative nature of the design, the level of significance adopted was .05.

Two-Way Analysis of Variance, Treatment x Reading Levels

The results of the two-way analysis of variance for treatment x reading levels on eight dependent variables are shown in Tables V-1 through V-8. These tables show the cell means and variances, treatment and level means, and the F ratios for effects due to treatment and reading levels. The findings for each school are presented individually within each table. Full analysis of variance tables are included in Appendix H.

For each analysis the size of the n's was the same, and in all cases the comparisons were between equal n's. In the case of School A the treatment n's were twenty-one and the reading level n's fourteen with a cell size of seven. The other two schools had treatment and reading level n's of twenty-four and sixteen

respectively with a cell size of eight.

There was no significant interaction effect on any of the eight analyses. Consequently no further reference will be made to interaction.

Dependent Variable One: Number of Words

Table V-1 shows that only in the case of School C was there a significant effect due to treatment. The mean number of words produced by the reading group in this school was significantly greater than that by the listening group. For School A a similar difference did not reach the level of significance; while in the case of School B the listening group produced more words than the reading group, but not significantly more.

With only one school revealing a significant effect due to treatment, the hypothesis that there was no difference due to treatment in the word length of the recall texts was not rejected.

For effects due to reading levels, Table V-1 shows that there was a significant difference in the case of School A and a highly significant difference in that of School B. However, the School C result showed there was no significant difference due to reading levels.

The results of Scheffe Tests to locate the differences that were significant revealed that for School A the difference between the High Reading Group and the Middle Reading Group was significant ($F = 3.86$; $p = .03$), while the difference between the High and the Low Groups approached but did not reach significance ($F = 3.06$;

TABLE V-1

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE ONE, NUMBER OF WORDS, FOR THE TREATMENT X READING LEVELS ANALYSIS OF VARIANCE

School A

SCHOOL A							
Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	212.6	7245.6	147.9	3356.5	150	1453	170.1
Reading	216	4451.3	158.3	2017.9	169.7	1837.3	181.3
Level Mean	214.3		153.1		159.9		

$F_{\text{treatment}} = .39; p = .537.$ $F_{\text{reading levels}} = 4.56; p = .016$

School B

Reading Levels							
Treatment	High		Middle		Low		Treatment Mean
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	219.8	3345.9	208.4	11731.1	146.4	2236.3	191.5
Reading	226.8	1210.5	186.8	3675.1	115.5	2163.7	176.3
Level Mean	223.3		197.6		130.9		

$F_{\text{treatment}} = .68; p = .414.$ $F_{\text{reading levels}} = 8.94; p = .001$

School C

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	178.6	1366.6	170.4	5951.9	153.4	4458.8	167.5
Reading	207.3	3689.1	218.8	647.6	201.6	6782.8	209.2
Level Mean	192.9		194.6		177.5		

$F_{\text{treatment}} = 5.48; p = .024.$ $F_{\text{reading levels}} = .37; p = .692$

$p = .06$). Between the Middle and Low groups the difference was not significant ($F = .47$; $p = .95$). For School B significant differences were revealed between the High and Low groups ($F = 4.37$; $p = .02$). The difference between the High and the Middle groups was not significant ($F = .65$; $p = .53$).

Examination of the level means in Table V-1 shows that where significant differences between levels did exist the higher levels produced a larger number of words than the lower ones. On the basis of these results, differences reaching a level of significance for two out of the three schools, the hypothesis that the number of words in the written recall texts was not related to reading levels was tentatively rejected.

Dependent Variable Two: Number of Response Units

The number of words in a text and the number of response units were quite highly related as would be expected. Correlations between these two variables ranged from .87 to .88 for the three schools in the study. The pattern of results from this analysis was, therefore, very similar to that of the previous one for number of words.

A significant difference due to treatment is shown only for School C in Table V-2. and the means show that this difference favoured the reading group. The hypothesis that there was no difference between the listening and the reading groups in the number of response units per written recall text was not rejected.

The similarity of pattern was maintained in the case of

TABLE V-2

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
TWO, NUMBER OF RESPONSE UNITS, FOR THE TREATMENT
X READING LEVELS ANALYSIS OF VARIANCE

School A

Reading Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	25	82.7	18.1	56.5	18.9	30.1	20.7
Reading	26.1	45.8	18.1	42.1	22.3	31.2	22.2
Level Mean	25.6		18.1		20.6		

$F_{\text{treatment}} = .51; p = .481.$ $F_{\text{reading levels}} = 4.18 p = .023$

School B

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	19.8	20.8	18.6	82.6	12.6	15.4	17
Reading	18.3	14.8	17.6	54.3	11.9	38.7	15.9
Level Mean	19.0		18.1		12.3		

$F_{\text{treatment}} = .37; p = .545.$ $F_{\text{reading levels}} = 5.71; p = .006$

School C

Reading Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	18.9	11.8	16.8	47.9	16.5	75.7	17.4
Reading	20.1	57.2	28.1	10.9	22.9	105.5	23.7
Level Mean	19.5		22.4		19.7		

$F_{\text{treatment}} = 9.34; p = .004.$ $F_{\text{reading levels}} = .84; p = .439$

differences due to reading levels. Scheffe Tests revealed a significant difference in School A only between High and Middle levels ($F = 3.86$; $p = .03$). The difference between High and Low Readers approached significance ($F = 3.06$; $p = .06$). That between Middle and Low Readers was not significant ($F = .47$; $p = .95$). For School B the differences between High and Low Readers ($F = 4.83$; $p = .02$) and between Middle and Low Readers ($F = 3.66$; $p = .04$) were significant, while that between High and Middle Readers was not ($F = .08$; $p = .92$). As in the case of number of words, the differences that were significant favoured the higher reading group.

Thus, the hypothesis of no effects due to reading levels upon the number of response units in the written recall texts was tentatively rejected.

Dependent Variable Three: Number of Recalled Ideas

The results of this analysis are shown in Table V-3. A significant effect due to treatment occurred in Schools A and C. In both cases the difference favoured the reading groups, as did the non-significant difference in the case of School B.

On the basis of a significant difference being revealed by two out of the three schools, the hypothesis of no significant effects due to treatment on the number of ideas recalled was tentatively rejected.

Only in the case of School A was there a significant effect due to reading levels. In the other two schools the differences only approached significance. Scheffe tests revealed that no single

TABLE V-3

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
THREE, NUMBER OF RECALLED IDEAS, FOR THE TREATMENT X
READING LEVELS ANALYSIS OF VARIANCE

School A

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	10.6	40.0	7.1	8.1	5.3	5.6	7.7
Reading	11.7	4.2	9.1	17.8	9.9	9.4	10.2
Level Mean	11.1		8.1		7.6		

$F_{\text{treatment}} = 4.89; p = .033.$ $F_{\text{reading levels}} = 3.63; p = .037$

School B

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	5.1	1.8	4.8	7.8	3.9	5.3	4.6
Reading	7.3	9.7	6.5	8.9	4.3	5.9	6.0
Level Mean	6.3		5.7		4.1		

$F_{\text{treatment}} = 3.06; p = .062.$ $F_{\text{reading levels}} = 3.14; p = .054$

School C

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	6.6	6.6	6.5	6.3	5.4	8.0	6.2
Reading	9.0	6.0	10.3	7.6	6.6	12.5	8.6
Level Mean	7.8		8.4		6.0		

$F_{\text{treatment}} = 9.25; p = .004.$ $F_{\text{reading levels}} = 3.15; p = .053$

School A contrast reached the level of significance.

The hypothesis that there was no difference between the reading levels in the number of ideas recalled was not rejected.

Dependent Variable Four: Number of
Recalled Ideas Presented in an
Appropriate Relationship

Schools B and C revealed significant effects due to treatment on this variable as shown in Table V-4. School A showed a difference that failed to reach a level of significance, but the difference was consistent with the pattern of the other two schools in that the mean of the reading group was higher than that of the listening group.

The hypothesis that treatment had no effect upon the number of recalled ideas that were presented in an appropriate relationship was tentatively rejected.

Since Table V-4 shows that on this variable there were no significant differences due to reading levels, the hypothesis of no relationship between the number of recalled ideas presented in an appropriate relationship and reading levels was not rejected.

Dependent Variable Five: Number of
Non-Distorted Recalled Ideas

A significant difference due to treatment was revealed for all three schools as shown by Table V-5. The direction of difference was consistent in that the mean of the reading group was the higher in all three cases.

The hypothesis that the number of non-distorted recalled

TABLE V-4

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE FOUR,
NUMBER OF RECALLED IDEAS PRESENTED IN AN APPROPRIATE
RELATIONSHIP, FOR THE TREATMENT X READING LEVELS
ANALYSIS OF VARIANCE

School A

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	8.3	40.9	6.1	5.1	3.3	7.9	5.9
Reading	9.7	6.6	6.9	26.1	7.6	7.6	8.0
Level Mean	9.0		6.5		5.4		

$F_{\text{treatment}} = 3.07; p = .088.$ $F_{\text{reading levels}} = 2.99; p = .063$

School B

School B							
Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	3.3	2.8	3.6	7.4	2.9	5.6	3.3
Reading	6.9	12.7	5.1	8.1	3.3	8.8	5.1
Level Mean	5.1		4.4		3.1		

$F_{\text{treatment}} = 5.34; p = .026.$ $F_{\text{reading levels}} = 2.19; p = .125$

School C

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	4.1	3.8	3.1	5.8	3.3	8.5	3.5
Reading	5.9	7.0	8.1	9.0	4.6	17.4	6.2
Level Mean	5.0		5.6		3.9		

$F_{\text{treatment}} = 10.24; p = .003.$ $F_{\text{reading levels}} = 1.36; p = .269$

TABLE V-5

CELL MEANS AND VARIANCES FOR DEPENDENT
VARIABLE FIVE, NUMBER OF NON-DISTORTED
RECALLED IDEAS, FOR THE TREATMENT X
READING LEVELS ANALYSIS OF VARIANCE

School A

SCHOOL A							
Reading Levels							
High			Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	8.0	18.0	5.6	3.3	4.0	6.0	5.9
Reading	10.0	6.3	7.1	12.5	8.4	10.0	8.5
Level Mean	9.0		6.4		6.2		

$F_{\text{treatment}} = 7.99; p = .008.$ $F_{\text{reading levels}} = 3.69; p = .035$

School B

SCHOOL 2							
Reading Levels							
High			Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	3.6	2.0	3.4	8.8	2.8	2.8	3.3
Reading	6.3	6.8	5.5	7.1	3.1	3.8	5.0
Level Mean	4.9		4.4		2.9		

$F_{\text{treatment}} = 6.70; p = .013.$ $F_{\text{reading levels}} = 3.31; p = .046$

School C

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	4.0	6.9	3.4	8.4	2.9	4.1	3.4
Reading	5.5	8.9	5.4	6.0	3.6	6.6	4.8
Level Mean	4.6		4.4		3.3		

$F_{\text{treatment}} = 4.35; p = .043.$ $F_{\text{reading levels}} = 1.76; p = .184$

ideas in the recall texts was not significantly affected by treatment was strongly rejected.

The difference due to reading levels reached the level of significance in the case of School A and of School B. For School C the difference was not significant. Scheffe tests revealed no single contrast between reading levels in either School A or School B that reached significance. Examination of the reading level means reveals that the differences were consistent in direction. In all cases higher means were recorded for higher reading levels. Thus, although no individual contrasts reached a level of significant difference, the hypothesis that reading levels did not significantly affect the number of non-distorted recalled ideas in the written recalls was tentatively rejected on the basis of two schools out of three showing differences that were significant.

Dependent Variable Six: Percentage
of Recalled Ideas Presented in
Isolation

The F ratios shown in Table V-6 for this variable all failed to reach a level of significance. Consequently the hypothesis that the percentage of recalled ideas presented in isolation in the written recall texts was not significantly affected by treatment was not rejected.

Only in the case of School B was there a significant difference due to reading levels. Scheffe tests revealed no single contrast within this school that was significant. The hypothesis that there was no significant effect due to reading levels upon the

TABLE V.-6

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE SIX,
PERCENTAGE OF RECALLED IDEAS PRESENTED IN ISOLATION,
FOR THE TREATMENT X READING LEVELS ANALYSIS OF VARIANCE

School A

SCHOOL A							
Reading Levels							
High			Middle		Low		Treatment Mean
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	16.0	367.5	9.6	149.5	39.9	1966.8	21.8
Reading	13.2	210.4	12.4	234.6	13.3	69.3	13.0
Level Mean	14.6		11.0		26.6		

$F_{\text{treatment}} = 1.64; p = .209.$ $F_{\text{reading levels}} = 1.87; p = .169$

School B

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	7.7	118.2	4.2	138.9	17.7	1199.2	9.9
Reading	4.2	138.9	4.6	102.2	28.1	1328.1	12.3
Level Mean	5.9		4.4		22.9		

$F_{\text{treatment}} = .14; p = .708.$ $F_{\text{reading levels}} = 3.35; p = .045$

School C

		Reading Levels						
		High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance		Mean
Listening	10.0	98.3	25.2	886.9	24.2	1450.0		19.8
Reading	7.1	162.7	8.2	302.9	12.3	195.5		9.2
Level Mean	8.6		16.7		18.2			

$F_{\text{treatment}} = 2.85; p = .098.$ $F_{\text{reading levels}} = .92; p = .406$

percentage of recalled ideas presented in isolation was not rejected.

Dependent Variable Seven: Percentage
of Recalled Ideas Presented in an
Inappropriate Relationship

No significant effects due to treatment are shown in Table V-7. The hypothesis of no difference between treatments in the percentage of recalled ideas presented in an inappropriate relationship was not rejected.

Similarly no effects were observed for reading levels so the hypothesis that the percentage of recalled ideas presented in an inappropriate relationship was not significantly affected by reading levels was not rejected.

Dependent Variable Eight: Percentage
of Response Units that were
Importations

Two of the F ratios for treatment effects shown in Table V-8 reached significance. That for the other school, School C, was not significant. The significant differences in the case of School A and of School B arose from the means of the listening groups being higher than those for the reading groups.

On the basis of two schools reaching significant levels of difference, the hypothesis that there was no difference due to treatment in the percentage of response units that were importations was tentatively rejected.

Table V-8 shows that none of the F ratios for effects due to reading levels was significant. The hypothesis of no significant differences between reading levels in the percentage of response

TABLE V'-7

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
SEVEN, PERCENTAGE OF RECALLED IDEAS PRESENTED IN AN
INAPPROPRIATE RELATIONSHIP, FOR THE TREATMENT X
READING LEVELS ANALYSIS OF VARIANCE

School A

		Reading Levels						
		High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean	
Listening	11.0	114.7	2.6	19.7	10.7	387.0	8.0	
Reading	4.4	36.8	23.4	584.7	11.0	265.1	12.9	
Level Mean	7.7		13.0		10.9			

$F_{\text{treatment}} = 1.05; p = .312.$ $F_{\text{reading levels}} = .43; p = .657$

School B

Treatment	Reading Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	30	807.1	23	613.5	22.6	1269.8	25.2
Reading	7.2	109.7	19.3	229.5	10.8	331.7	12.4
Level Mean	18.6		21.2		16.7		

$F_{\text{treatment}} = 3.51; p = .068.$ $F_{\text{reading levels}} = .14; p = .867$

School C

		Reading Levels						
		High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean	
Listening	33.6	862.7	32.2	346.6	27	416.5		31
Reading	26	368.7	14.7	226.6	33.3	884.1		24.7
Level Mean	29.8		23.5		30.2			

$F_{\text{treatment}} = .92; p = .342.$ $F_{\text{reading levels}} = .44; p = .647$

TABLE V-8

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
EIGHT, PERCENTAGE OF RESPONSE UNITS THAT WERE
IMPORTATIONS, FOR THE TREATMENT X READING LEVELS
ANALYSIS OF VARIANCE

School A

Reading Levels							
High		Middle		Low		Treatment Mean	
Treatment	Mean	Variance	Mean	Variance	Mean		Variance
Listening	43.2	158.3	48.4	374.1	56.1	515.6	49.2
Reading	26.6	152.9	44.8	456.5	40	232.4	37.1
Level Mean	34.9		46.6		48.1		

$F_{\text{treatment}} = 4.89; p = .033.$ $F_{\text{reading levels}} = 2.32; p = .113$

School B

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	51	149.6	38.4	440.7	39.4	111.3	42.9
Reading	31.9	351.9	28.8	304.9	33.3	413.4	31.3
Level Mean	41.5		33.6		36.3		

$F_{\text{treatment}} = 5.49; p = .024.$ $F_{\text{reading levels}} = .87; p = .425$

School C

Reading Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	54.6	272.6	41.3	281.5	48.3	359.2	48
Reading	45.2	172.6	54.3	201.7	55.9	306.6	51.8
Level Mean	49.9		47.8		52.1		

$F_{\text{treatment}} = .64; p = .427.$ $F_{\text{reading levels}} = .27; p = .763$

units that were importations was not rejected.

Two-Way Analysis of Variance,
Treatment x Listening Levels

The main effects due to treatment were not presented. Since the composition of the treatment groups was closely similar for both two-way analyses, these results were almost identical to these presented from the treatment x reading levels analyses.

Table V-9 shows the F ratios for the main effects due to listening levels derived from the two-way analyses of variance, treatment x listening levels. A comparison between these ratios and those shown for main effects due to reading levels shows that, except for two variables, the pattern of significant differences was the same. Dependent variable four, number of recalled ideas presented in an appropriate relationship, produced significant differences due to listening in the case of School A and School B. Scheffe tests revealed that for School A the difference between High Listeners and Middle Listeners was the only significant contrast. For School B no contrast was individually significant. Variable six, percentage of recalled ideas presented in isolation, failed to produce a significant difference due to listening levels whereas such a difference was found for reading levels. Full tabular details of the findings from the two-way analysis of variance, treatment x listening levels, are in Appendices I and J.

TABLE V-9

F RATIOS FOR THE MAIN EFFECTS DUE TO LISTENING LEVELS FROM THE
TWO-WAY ANALYSIS OF VARIANCE, TREATMENT X LISTENING LEVELS

Number	Dependent Variable Variable	F Ratio		
		School A df=2,36	School B df=2,42	School C df=2,42
1	Number of Words	8.14**	9.39***	.62
2	Number of Response Units	6.44**	4.88*	.13
3	Number of Recalled Ideas	4.46**	3.13	1.55
4	Number of Recalled Ideas Presented in an Appropriate Relationship	6.29**	3.55*	1.08
5	Number of Non-Distorted Recalled Ideas	5.05*	4.42*	1.82
6	Percentage of Recalled Ideas Presented in Isolation	1.53	.99	.57
7	Percentage of Recalled Ideas Presented in an Inappropriate Relationship	1.83	1.40	.11
8	Percentage of Response Units that were Importations	.48	.16	.03

* $p < .05$; ** $p < .01$; *** $p < .001$.

Z Tests of the Significance of the Differences
Between Proportions of Distortion
Categories and Between Proportions
of Importation Categories

The results of these analyses are shown in Tables V-10, V-11 and V-12. Table V-10 contains the results pertaining to the categories of distorted recalled ideas. Table V-11 contains the results of the comparison between the proportions of the different categories of imported response units expressed as percentages of the total number of all response units. Table V-12 deals with those of each category of imported response unit expressed as a percentage of the total number of imported response units.

Differences Between the Proportions
of the Different Categories of
Distorted Recalled Ideas

Table V-10 shows that there were only very slight and non-significant differences between the two treatment groups in the proportion of distorted recalled ideas in Category One, Changes in Key Words. This was true of all three schools. The hypothesis that there was no significant difference due to treatment in the proportion of distorted recalled ideas attributable to changes in key words was not rejected.

In the case of Category Two distortions, there was a significant difference between the proportions in the case of one school, School A. A significantly higher proportion of this category was observed in the reading group in this school. The same direction of difference was observed in the other two schools but in School B's

TABLE V -10
Z TESTS OF THE DIFFERENCES BETWEEN PROPORTIONS OF DISTORTED RECALLED
IDEAS IN EACH CATEGORY FOR THE LISTENING AND READING GROUPS

School A	Category 1		Category 2		Category 3		Category 4	
	Total	Proportion	Total	Proportion	Total	Proportion	Total	Proportion
Listening Group n=24	43	5	11.6	8	27	62.8	3	7.0
Reading Group n=23	38	5	13.2	15	15	39.5	3	7.8
Z Value			.209		2.079*	2.096*		.157
School B								
	Category 1		Category 2		Category 3		Category 4	
	Total	Proportion	Total	Proportion	Total	Proportion	Total	Proportion
Listening Group n=24	36	1	2.8	4	27	75	4	11.1
Reading Group n=24	26	3	11.5	3	18	69.3	2	7.7
Z Value			1.386		.052	.502		.449
School C								
	Category 1		Category 2		Category 3		Category 4	
	Total	Proportion	Total	Proportion	Total	Proportion	Total	Proportion
Listening Group n=25	71	7	9.9	30	34	47.9	0	0.0
Reading Group n=24	91	3	3.3	49	36	39.6	3	3.3
Z Value			1.722		1.465	1.062		1.544

* p < .05

case it was negligible and in School C's not significant. The hypothesis of no significant effect due to treatment in the proportion of distorted recalled ideas that was attributable to changes in domain of application was not rejected.

In the case of Category Three distortions, changes in level of precision, a consistent direction of difference was observed as shown in Table V-10. In all cases the proportion for the listening group was higher than for the reading group, but only in the case of School A was this difference significant. The hypothesis that there was no significant difference due to treatment in the proportion of distorted recalled ideas that were attributable to changes in level of precision was not rejected.

Table V-10 shows that only a very small number of distorted recalled ideas belonged to Category Four, the residual category. No significant differences on this variable were observed between the two treatment groups in any school. The hypothesis that there was no significant difference due to treatment in the proportion of distorted recalled ideas in Category Four was not rejected.

Differences Between the Proportions
of the Different Categories of
Imported Response Units

Two sets of z tests were carried out to test for significant differences between the proportions of the three categories of imported response units in the recall texts of the reading and listening groups. For one set of tests the proportions involved were the proportions of total response units that belonged to each

category. For the other set the proportions were the proportions of imported response units that belonged to each category.

Category one imported response units: Logical inferences, assumptions and conclusions. Table V-11 shows that when the number of response units in this category was expressed as a proportion of the total number of response units in the recall texts, a significant difference was revealed for School B. The proportion for the listening group was significantly greater. However, the two remaining schools did not reveal a difference that was significant. The hypothesis that there was no significant difference due to treatment in the proportion of response units that were importations of the category of logical inferences, assumptions and conclusions was not rejected.

When this category of importations was expressed as a proportion of imported response units (Table V-12), the difference between the proportions of the two treatment groups was significant in the case of Schools A and B. However, the direction of difference was inconsistent. School A showed a higher proportion for the reading group; in the case of School B it was higher for the listening group. The hypothesis that there was no significant difference due to treatment in the proportion of imported response units that were logical inferences, assumptions and conclusions was not rejected because of the fact that the direction of difference was not consistent.

TABLE V-11
Z TESTS OF THE DIFFERENCES BETWEEN PROPORTIONS OF TOTAL RESPONSE UNITS
IN EACH CATEGORY OF INFORMATION FOR THE LISTENING AND READING GROUPS

School A	Category 1		Category 2		Category 4	
	Total Response Units	Total Proportion	Total Proportion	Total Proportion	Total Proportion	Total Proportion
Listening Group n=24	487	113	23.2	111	22.8	12 2.5
Reading Group n=23	517	113	21.8	69	13.3	8 1.5
Z Values			.51		3.9**	1.04
School B	Category 1		Category 2		Category 4	
	Total Response Units	Total Proportion	Total Proportion	Total Proportion	Total Proportion	Total Proportion
Listening Group n=24	408	90	22.0	57	13.9	29 7.1
Reading Group n=24	382	48	12.6	48	12.6	26 6.8
Z Values			3.51**		.58	.17
School C	Category 1		Category 2		Category 4	
	Total Response Units	Total Proportion	Total Proportion	Total Proportion	Total Proportion	Total Proportion
Listening Group n=25	442	128	28.9	73	16.5	12 2.7
Reading Group n=24	569	167	29.5	10.8	18.9	30 5.3
Z Values			.14		1.01	2.02*

* $p < .05$; ** $p < .01$.

Category two imported response units: Consistent new information. Table V-11 shows that only in the case of School A was there a significant difference between the proportions of total response units that belonged to Category Two. Only very slight differences were noted for the other two schools. The Listening Group in School A had a higher proportion of response units in this category than the reading group. The hypothesis that there was no significant effect due to treatment on the proportion of response units that were consistent new information was not rejected.

When the imported response units in this category were expressed as proportions of all imported response units, Table V-11 shows that one school, School A, revealed a significant difference, while the others did not. The difference favoured the Listening Group. The hypothesis that there was no significant difference due to treatment in the proportion of imported response units that were consistent new information was not rejected.

Category three imported response units: Inconsistent new information. Table V-11 shows that in the case of School C there was a significant difference between the two groups when the response units in this category were expressed as proportions of all response units, the difference favouring the reading group. However, the numbers involved were small and the differences in the cases of the two remaining schools were small and non-significant. The hypothesis that there was no significant difference due to treatment in the proportion of response units that were inconsistent

new information was not rejected.

Table V-12 shows that there were no significant differences between the proportions of imported response units that belonged to Category Three. The numbers of response units in this category were small and the resulting proportions were quite similar. The hypothesis that there was no significant difference due to treatment in the proportions of imported response units that were inconsistent new information was not rejected.

Correlations Among Selected Variables

The intercorrelations among the eight variables that were tested by analysis of variance and reading and listening scores are shown in Tables V-13, V-14 and V-15 for each school independently. Although no hypotheses were set up to be addressed by these correlational findings, they indicate relationships among the several variables involved, and reference will be made to these relationships in the discussion of conclusions drawn from the findings.

The tables show that reading and listening scores were highly correlated, correlations ranging from .69 to .79. The overall correlation between the two variables when the three samples were pooled ($n = 144$) was .725. This finding was within the range reported by Spearritt (1962) and Jester (1966) in their surveys of research findings into the relationships between reading and listening.

High intercorrelations are also shown among three scores related to recalled ideas: Number of recalled ideas, number of

TABLE V-12
Z TESTS OF THE DIFFERENCES BETWEEN PROPORTIONS OF IMPORTED RESPONSE UNITS
IN EACH CATEGORY OF IMPORTATION FOR THE LISTENING AND READING GROUPS

IN EACH CATEGORY OF IMPORTATION FOR THE LISTENING AND READING GROUPS									
School A			Category 1			Category 2		Category 3	
Total	Total	Proportion	Total	Proportion	Total	Proportion	Total	Proportion	
Listening Group n=24	236	113	47.8	111	47.0	12	5.2		
Reading Group n=23	190	113	59.4	69	36.3	8	4.3		
Z Value			2.383*		2.226*		.424		
School B									
Category 1			Category 2		Category 3				
Total	Total	Proportion	Total	Proportion	Total	Proportion	Total	Proportion	
Listening Group n=24	176	90	51.2	57	32.4	29	16.3		
Reading Group n=24	122	48	39.4	48	39.4	26	21.2		
Z Value			2.007*		1.236		1.058		
School C									
Category 1			Category 2		Category 3				
Total	Total	Proportion	Total	Proportion	Total	Proportion	Total	Proportion	
Listening Group n=25	213	128	60.1	73	34.3	12	5.6		
Reading Group n=24	305	167	54.4	108	35.4	30	10.2		
Z Value			1.208		.267		1.724		

* p < .05

TABLE V'-13
INTERCORRELATION MATRIX FOR STANDARDIZED TEST SCORES AND
EIGHT DEPENDENT VARIABLES FOR SCHOOL A (n=47)

Variable	1	2	3	4	5	6	7	8	9	10
1 Reading Score		.688*	.404*	.322*	.408*	.376*	.398*	-.338*	.062	-.348*
2 Listening Score			.375*	.361*	.293*	.328*	.257	-.259	.041	-.133
3 Number of Words				.880*	.689*	.670*	.635*	-.254	-.181	-.181
4 Number of Response Units					.641*	.652*	.586*	-.280	-.146	-.096
5 Number of Recalled Ideas						.911*	.895*	-.344*	-.250	-.574*
6 Number of Recalled Ideas Presented in an Appropriate Relationship							.859*	-.508*	-.389*	-.551*
7 Number of non-Distorted Recalled Ideas								-.358*	-.250	-.606*
8 Percentage of Recalled Ideas Presented in Isolation									-.125	.295*
9 Percentage of Recalled Ideas Presented in Inappropriate Relationship										.312*
10 Percentage of Response Units that were Importations										

* p < .05

TABLE V -14

INTERCORRELATION MATRIX FOR STANDARDIZED TEST SCORES AND
EIGHT DEPENDENT VARIABLES FOR SCHOOL B (n=48)

Variable	1	2	3	4	5	6	7	8	9	10
1 Reading Score		.688*	.555*	.469*	.395*	.338*	.361*	-.391*	.081	.053
2 Listening Score			.447*	.396*	.415*	.376*	.395*	-.269	.008	-.058
3 Number of Words				.869*	.502*	.423*	.456*	-.397*	.109	-.028
4 Number of Response Units					.397*	.348*	.353*	-.390*	.104	.083
5 Number of Recalled Ideas						.915*	.896*	-.410*	.263	-.504*
6 Number of Recalled Ideas Presented in an Appropriate Relationship							.882*	-.476*	-.472*	-.573*
7 Number of non-Distorted Recalled Ideas								-.400*	-.332*	-.525*
8 Percentage of Recalled Ideas Presented in Isolation									-.077	.028
9 Percentage of Recalled Ideas Presented in Inappropriate Relationship										.507*
10 Percentage of Response Units that were importations										

* $p < .05$

TABLE V -15
INTERCORRELATION MATRIX FOR STANDARDIZED TEST SCORES AND
EIGHT DEPENDENT VARIABLES FOR SCHOOL C (n=49)

Variable	1	2	3	4	5	6	7	8	9	10
1 Reading Score		.785*	.167	.080	.333*	.240	.405*	-.086	-.083	-.063
2 Listening Score			.190	.076	.309*	.209	.336*	-.124	-.087	-.122
3 Number of Words				.882*	.582*	.541*	.501*	-.359*	-.320*	.099
4 Number of Response Units					.585*	.591*	.485*	-.358*	-.371*	.191
5 Number of Recalled Ideas						.841*	.790*	-.289*	-.551*	-.358*
6 Number of Recalled Ideas Presented in an Appropriate Relationship							.682*	-.480*	-.683*	-.176
7 Number of non-Distorted Recalled Ideas								-.192	-.479*	-.312*
8 Percentage of Recalled Ideas Presented in Isolation									-.054	-.101
9 Percentage of Recalled Ideas Presented in Inappropriate Relationship										-.203
10 Percentage of Response Units that were Importations										

* $p < .05$

recalled ideas demonstrating an appropriate relationship and number of non-distorted recalled ideas. These ranged from .79 to .92. This indicated that these three scores were not independent of each other. Their high relationship probably arose from the fact that the definition of distortion and of the two types of deviant relationship were somewhat lenient.

Low but significant correlations were observed for all three schools between reading scores and recalled ideas (.33 to .41), and between reading scores and non-distorted recalled ideas (.36 to .41). The correlations between listening scores and these two variables were uniformly significant only in the case of recalled ideas. These correlations indicated that a positive relationship existed between reading and listening as measured by standardized tests and the ability to recall explicitly stated original ideas.

In the case of School A there was a significant negative correlation between reading and percentage of response units that were importations. Otherwise this latter variable was not significantly related to either reading or listening.

The percentage of response units that were importations was significantly related to certain recalled idea scores. Low to moderate negative correlations existed between this variable and recalled ideas (-.36 to -.57) and non-distorted recalled ideas (-.31 to -.61). These correlations indicated that recall texts which scored more highly on recalled ideas tended to contain a lower proportion of imported response units.

Summary of the Findings from the Statistical Analyses

Table V-16 presents a summary of the findings from these statistical analyses in the form of the status of the hypotheses. This table shows that significant differences were found to exist between the two treatment groups, listening and reading, with respect to the following variables:

1. Number of recalled ideas (Reading > Listening)
2. Number of recalled ideas presented in an appropriate relationship (Reading > Listening).
3. Number of non-distorted recalled ideas (Reading > Listening).
4. Percentage of response units that were importations (Listening > Reading).

While significant differences were found to exist between the percentages of imported response units that were logical inferences, assumptions and conclusions, no rejection of the null hypothesis was possible because of the inconsistent direction of difference.

No significant differences were found between the two treatment groups with respect to the percentage of recalled ideas presented either in isolation or in an inappropriate relationship. Also no significant differences between the two treatment groups were revealed for the proportions of any of the categories of distorted recalled ideas. Similarly the two groups were not distinguished by differences between the proportions of any of the

TABLE V-16

SUMMARY OF THE FINDINGS OF PHASE TWO EXPRESSED AS NON-REJECTION,
TENTATIVE REJECTION AND STRONG REJECTION OF THE NULL HYPOTHESES

Null Hypotheses	Dependent Variable	Treatment	Effects	
			Reading Levels	Listening Levels
1.1	Number of words	NR	TR	TR
1.2	Number of response units	NR	TR	TR
1.3	Number of recalled ideas	TR	NR	NR
1.4	Number of recalled ideas presented in an appropriate relationship	TR	NR	TR
1.5	Number of non-distorted recalled ideas	SR	TR	TR
1.6	Percentage of recalled ideas presented in isolation	NR	NR	NR
1.7	Percentage of recalled ideas presented in an inappropriate relationship	NR	NR	NR
1.8	Percentage of response units that were importations	TR	NR	NR
2.1	Percentage of distorted recalled ideas in Category One	NR		
2.2	Percentage of distorted recalled ideas in Category Two	NR		
2.3	Percentage of distorted recalled ideas in Category Three	NR		
2.4	Percentage of distorted recalled ideas in Category Four	NR		
2.5	Percentage of response units in importation Category One	NR		
2.6	Percentage of response units in importation Category Two	NR		
2.7	Percentage of response units in importation Category Three	NR		
2.8	Percentage of imported response units in Category One	NR		

TABLE V.-16 (continued)

Null Hypotheses	Dependent Variable	Treatment	Effects	
			Reading Levels	Listening Levels
2.9	Percentage of imported response units in Category Two	NR		
2.10	Percentage of imported response units in Category Three	NR		

NR = Not Rejected; TR = Tentatively Rejected;

SR = Strongly Rejected.

importation categories expressed either as percentages of total response units or as percentages of total imported response units.

Significant differences among the recall texts of the three reading levels were revealed for two out of the three schools for number of words, number of response units, and number of non-distorted recalled ideas.

Significant differences among the recall texts of the three listening levels were revealed for two out of the three schools for number of words, number of response units, number of recalled ideas presented in an appropriate relationship, and number of non-distorted recalled ideas.

These findings referred to the differences existing between the recall performances of the treatment groups. The conclusions about processing differences which can be inferred logically from these recall differences will be presented in Chapter VII. Preceding that discussion will be the presentation of findings from an informal analysis of the recall of selected individual original ideas from the stimulus passages.

CHAPTER VI

AN INFORMAL ANALYSIS OF THE RECALL OF SELECTED ORIGINAL IDEAS

Introduction

The findings described in Chapter V showed that, considering overall group performance, explicitly stated original ideas were less well recalled by listeners than by readers. This would seem to indicate that the variables which attended spontaneous speech, extraneous material, more frequent linguistic deviance and poorer rhetorical structure, together with channel differences, combined to inhibit recall by listeners relative to that of readers.

An attempt was made by an informal analysis to observe the effects of individual variables upon recall. Since natural discourse was used as stimulus material, these effects could not be observed in any systematic, controlled way. However, in some cases individual original ideas which had been attended in the oral version of a passage by such factors as mazes, linguistic deviance and poor rhetorical structure were available free of these characteristics in the equivalent written version. In such cases the recall pattern of the original ideas by the two groups could be compared to see what effect the factor had had upon recall.

One procedure used in the analysis was to tally for each treatment group the number of times each explicitly stated idea was recalled either in a distorted or a non-distorted form. Cases

where there was a noticeable difference between the two groups were examined in their written and oral forms to see how their expression had varied and to see if any of the variables identified in the major pilot study as characteristics of spontaneous speech distinguishing it from formal writing had possibly affected recall.

A second procedure was to identify in the oral versions examples of the occurrence of these variables. The recall performance of the listeners on ideas contiguous with these characteristics was then compared with that of the readers. This second procedure complemented the first in the sense that it revealed those cases where no difference in the recall pattern existed as well as those where one did.

The results of this informal analysis are presented as very tentative findings, suggestive of effects and relationships rather than evidence of them. Since natural discourse was used as the stimulus materials, no attempt had been made to build in the factors under consideration. Consequently clear-cut examples were relatively few.

Also, because large units of text were used, the effects of each individual variable could not be observed independently of all other factors. The recall and processing of one idea would be affected by its relationship to other ideas as well as by the form of its own expression. For example, if an idea contained a maze in its oral form, one could not be certain that the presence of the maze was the most significant feature affecting its recall. The fact that

contiguous ideas in the written version were also expressed differently than in the oral version was another source of variation possibly affecting the recalls. Consequently the effects of particular variables were clouded in this way.

In a similar way the variables were not independent of each other. Some original ideas were attended by several variables in their oral expression. For example, the idea United Nations A2 was expressed orally as:

Em the United Nations is originally was intended to be a peace-keeping body and em it's you know performed this function to er a certain extent a even limited extent during the past ever since it was formed

Variables present here were audible pauses, filler words and syntactic deviance. In a case like this--and the majority of ideas involved in this informal analysis demonstrated the presence of more than one variable in the oral version--the effects of single variables could not be observed.

The Effects of Visual Information on the Recall of the Listening Group

This informal examination of the recall patterns of individual ideas revealed no evidence that any visual aspect of the videotaped presentation to the listening group had affected recall. In cases where there were noticeable discrepancies between the number of times an idea was recalled by one group as opposed to the other group, the videotape was carefully examined to see if factors such as facial expression, gesture or postural changes were involved

at the point when that idea was uttered. In no case was anything untoward or at all remarkable evident from simply watching the two participants in the discussion. Apparently any differences were attributable to linguistic and rhetorical factors.

The Effects of Extraneous Material on the Recall of the Listening Group

Some original ideas were attended by mazes, filler words and audible pauses in their oral expression and of course this extraneous material had been entirely eliminated from the written versions. The group recalls of such original ideas were tabulated.

It was found that some "noise"-affected ideas were better recalled by the reading group. For example, the original idea, Hockey B6, was expressed in the oral version as:

However, (the new clubs) the ignorant American
fans enjoy this type of hockey.

The written version was:

However, the fans who support the new clubs,
especially the inexperienced American fans,
do enjoy the hockey they see today.

The listening group as a whole achieved only one recall of this idea while the reading group recorded twelve. However, ten of these were distorted, mainly because of Category Two distortion, changes in the domain of application. This distortion was probably caused by the rather complex restrictive clause in the written version. The maze in the oral version does interrupt the syntax and perhaps this interruption made the processing of the idea difficult for the listeners. The word "ignorant" in the oral version, being

strong and obtrusive, might have been expected to render this idea memorable if it had been processed completely.

Another original idea that contained a maze in its oral expression was Mental Illness B1. The speaker said:

Er yes, The Blair Report brought out by the last (Conservative) er Social Credit government did a lot to recognize this problem.

The listening group recalled this idea four times with two distortions as against seven with three distortions by the reading group.

The original idea, Mental Illness F1, was attended by two mazes in the oral version. The speaker said:

Well, (the people that) nobody is really incurable (as far as er)

In the written version this was expressed as:

"No one is really incurable."

The reading group recorded eighteen recalls of this idea, one being distorted. The figure for the listening group was twelve, two distorted.

On the other hand, differences sometimes favoured the listening group. For example, the original idea, United Nations A9, was expressed by the speaker as:

... and so the choice boiled down to, do we either take Taiwan into the picture (or do we take Nationalist China, er excuse me) or do we take Communist China?

This produced seven undistorted recalls by the listening group as opposed to only one by the other group which read:

... a choice had to be made between them.

The same direction of difference was observed in the case of United Nations A1. Its oral expression contained a maze and an audible pause, yet the listeners achieved nine recalls as against only four by the readers.

There were other original ideas marked by mazes and other types of extraneous material in the oral version. However, their recall was not notably different in either version so that no effects due to "noise" could be detected.

One could conclude that the presence of extraneous material sometimes appeared to make an idea difficult to process and recall. But the presence of such material was not a reliable predictor of difficulty. There are undoubtedly differences of degree in the interference effects that extraneous material can have and this may have been the reason for some of the inconsistency in the relationship between this phenomenon and recall.

The Effects of Linguistic Deviance on the Recall of the Listening Group

No consistent effect upon recall was discernible for syntactic and semantic deviance. In some cases where these were present in the oral version the listening group's recall performance was inferior to that of the reading group. For example, the idea, Mental Illness A4, was expressed by an oral structure that was not syntactically acceptable:

They're facilities are more like prisons
than the actual treatment centres.

This contrasted with the written form:

They are more like prisons than centres for
the treatment of mental illness.

Five subjects in the listening group recalled this idea and one of the recalls was distorted. Eight recalls, none distorted were recorded by the reading group. However, no difference was recorded by the two group recalls of another idea, United Nations A10 which was also syntactically unacceptable in the oral version. Both groups recorded eleven undistorted recalls.

The original idea, United Nations C4, was expressed orally in what could be considered a semantically deviant form:

I mean the communist nations might have
(been form you know, might have s . . .) had
somebody come promote the idea that they
should try to suppress the United States'
ideas er and philosophies.

The words "suppress" and "philosophies" are somewhat inappropriate. No recalls were recorded for the listening group for this idea, while there were two for the reading group. A similar small difference was recorded for the original idea, United Nations B5, which was also expressed orally as a semantically deviant form. In the case of these two ideas, United Nations C4 and B5 the small number of recalls by the reading group would seem to indicate that the use of inappropriate words was, in itself, not the sole cause of poor recall. With the problem removed from the written version, recall remained very sparse.

As in the case of extraneous material, some structures that were either syntactically or semantically deviant in the oral

version did not seem to have affected the recall of the ideas they expressed. There was no discernible difference between the performance of the two groups.

In the case of operative deviance, the relationship between complexity of structure and poor recall performance seemed to be somewhat stronger, though not wholly consistent. For example the original ideas, Mental Illness D1 and D2 were expressed orally as:

Well sort of because (they) the patients who are not really institutionalized yet, who just go in there for short-term er cures (or) to alleviate their problems over a short period of time do not really become very institutionalized.

The listening group recorded a total of only one recall for these two ideas. The figure for the reading group was five.

The same pattern was evident for the complex oral answer in the Mental Illness discussion extending from idea F4 through F11. The points were unclear and difficult to follow. These eight ideas produced a total of only seven recalls by the listening group. The corresponding figure for the reading group, which was exposed to these ideas in a clearer form, was eighteen.

These two extended examples suggest that operatively deviant structures were difficult to process, resulting in poor recall. However, one complex sequence in the oral version of the Hockey discussion did not follow the same pattern. The ideas D2 through D4, expressed orally in this complex sequence, were recalled slightly better by the listening group than by the reading group. The reason for this might have been that the speaker in this



discussion was very fluent and spoke with good intonation and emphasis. Table V-2 in Chapter V showed that the speaker in the Hockey Discussion produced less extraneous material than the others. His expressive ability might have helped steer the listener through the complexity of this particular sequence of ideas, allowing processing to continue unimpeded.

In the United Nations passage three original ideas, A3, A10 and B10, which were expressed orally in operatively deviant structures, were recalled equally well by both listeners and readers. This was a further indication that operative deviance was not a consistent predictor of processing difficulty.

The Effects of Vague Anaphoric Reference on Recall

The earlier comparative analysis did not reveal that spontaneous speech and formal writing differed with respect to the use of anaphora. Anaphora refers to the use of words such as pronouns and demonstratives which depend for their interpretation upon words occurring earlier in the text. Examination of original ideas which showed marked discrepancies of recall performance by the two groups revealed that this characteristic of language might have played a significant part, especially when the reference for the anaphoric word was unclear. All cases occurred in the spoken versions.

The original idea, United Nations B3, was expressed orally as:

... and they tried to develop as much opposition to this as possible.

The anaphoric word, "this" referred to "decision" occurring in the previous sentence which in turn referred to the decision to admit Communist China to the United Nations. This last idea was part of the answer to the previous question. Therefore, in order to process B3, the listener had to be able to decide which idea was intended as the reference for "this" as well as be able to recall it. B3 recorded no listening group recalls. In the written version the word "decision" was repeated in the statement of idea B3, replacing "this", and the idea to which "decision" referred was itself repeated in the interviewer's question. In this way the meaning of B3 was made clearer. Four recalls, none distorted, were recorded by the reading group.

The same feature was characteristic of the oral expression of Mental Illness G5:

... now they've got drugs to control that.

"That" referred to epilepsy which occurred forty words earlier in the text in the form "epileptics". In the intervening discourse "epileptics" was the reference for the word "they" four times and for the word "he" once. This information had to be carried by the listener through the different anaphoric transformations in order to process G5. Five listeners did, one of whom produced a distorted recall. Fifteen was the corresponding number for the reading group. In the written version the word "epileptics" occurred sixteen words before the expression of G5 and the anaphoric word "they" carried

the idea twice. Then in the expression of G5 itself "this condition" was substituted for "this".

Similarly Hockey A8 and A9 involved the vague use of anaphora in the oral version. Together these two ideas recorded six recalls, four of them distorted, for the listening group, as against thirteen, four distorted, for the reading group.

The use of vague anaphora is considered a stylistic fault in writing. The Publication Manual of the American Psychological Association (1967) specifically warned against the use of the "indefinite "this" (p. 16)." It seems reasonable to assume, therefore, that its occurrence will be more common in spontaneous speech than in formal writing. The consistent evidence from this informal analysis suggested that it was related to infrequency of recall and, by implication, to unsuccessful processing. Speech is transient and the listener has no chance to check back over previous text to find the intended reference. In this way the use of vague anaphora in speech would be a predictable cause of interpretation difficulty.

Summary of Findings

The tentative informal analysis revealed that the effects of extraneous material and of the two types of linguistic deviance, syntactic and semantic, were not consistent enough to indicate that they exerted inhibitory effects on the recall of spontaneous speech. Slightly more consistency was revealed in the effects of operative deviance in two discussion passages. In the third passage the more

fluent expression of the speaker might have offset its effects. Another factor, not identified in the major pilot study as a characteristic of spontaneous speech, emerged as appearing to have an effect upon the recall performance of listeners. Vague anaphoric reference, occurring in the oral discussions and not in the written ones, appeared to have a marked inhibitory effect upon recall.

A discussion of these findings will be included in the chapter which follows as part of the interpretation of the findings of the study in terms of the differences between reading and listening processes.

CHAPTER VII

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Introduction

Reading and listening form the receptive aspects of the language arts. As such they constitute a class of communicative activity which can be called language processing, the reception and interpretation of linguistic messages. There are some obvious differences between the processing of written language and the processing of spoken language arising from the different channels of communication utilized. To some extent these differences distinguish the domain of reading from the domain of listening. Beyond this, the differences and similarities between the two types of language processing are ill-defined. The purpose of this study was to compare reading and listening to see if any differences existed between the way relatively mature subjects processed spontaneous speech and formal writing. This comparison was between the processing of one register of spontaneous, impromptu speech and the processing of one register of formal writing. It was expected that this comparative strategy would help illuminate some of the unique attributes of reading as a processing activity.

This chapter presents a brief summary of the study and then provides a discussion of the conclusions derived from the findings as they related to the research question. This will be

followed by a discussion of the limitations of the study, suggestions for further research, and the implications arising from the study.

Summary of the Study

The study was an attempt to compare the processing of spontaneous speech and formal writing by relatively mature subjects. This comparison was effected from a theoretical perspective which claimed that language processing consisted of the operation of two principles, cue selection and message reconstruction. The focus of the study was, therefore, upon the differential operation of these two principles in the two receptive language processes given the two different kinds of linguistic inputs and the different perceptual mechanisms involved.

One problem which faced the study was to achieve specificity in the research question it was attempting to answer. In view of the absence of any similar research comparing reading with listening to spontaneous speech, it was difficult to establish a definite predictive hypothesis based on previous research evidence. Consequently the study embarked with a research question which was very general and somewhat vague asking whether there were any differences between the two types of language processing, listening to spontaneous speech and reading formal writing.

The generality of this question was first reduced by the attempt to define process in reading and listening as the operation of the two human information processing principles of cue selection and message reconstruction. A review of recent literature relating

to both reading and listening established the validity of these two principles. The research question could then focus upon the operation of these two principles in each of the two processing activities.

Further concreteness was achieved by the results of a major pilot study comparing spontaneous speech and formal writing as the two inputs into the processes which were the primary focus of the study. The differences between the two types of language suggested a predictive element which could be introduced into the research question. It now asked whether the processing of formal writing was different from the processing of spontaneous speech in that the reader's reconstructions were subject to a more rigorous discipline and to demands of greater precision and exactness arising from the tighter system of linguistic and ideational constraints of formal writing.

The study was designed to provide data that could be used to answer this question. Spoken and written versions of three discussions were prepared as stimulus materials for three independent samples of grade eleven students. Each sample was stratified into three reading and listening levels and then randomly assigned to either a listening or a reading treatment group. The listening groups were exposed to videotape recording of spontaneous spoken discussions and the other groups read the formal written versions. Immediately following this exposure, both groups of subjects wrote down what they could recall of the discussion. The resulting recall texts were analyzed using a system of post hoc categories to classify certain phenomena they demonstrated which were logically

related to listening and reading processes.

Hypotheses relating to differences between the two sets of recall texts guided the statistical analysis of the data obtained from the classification of the recall texts. The findings from this analysis, therefore, were the significant and non-significant differences that existed between the recalls of the treatment groups and between the several levels of listening and reading. The task remaining was to draw conclusions from these findings about the nature of reading and listening and to show how the recall differences related to the question of differences between the two processes. This discussion is contained in the following section.

Conclusions Related to the Differences Between Reading and Listening

The findings reported in Chapter V and the results of the informal analysis contained in Chapter VI revealed some differences between the recall texts of the two treatment groups. However, the object of the study was to investigate, not the processes of recall, but aspects of the processes of reading and listening. These findings, therefore, did not themselves answer the research question. An answer to the question of whether the meaning reconstructions of readers were more precise and exact than those of listeners to spontaneous speech depended upon the building of inferential connections between the recall differences and the processes of reconstruction and interpretation that were involved in the listening and reading activity that preceded the

recall task.

The theoretical basis for these inferences was laid in Chapter II when the rationale for the use of a recall task to reveal aspects of reading and listening processes was presented. Essentially the argument was that since the recall task was identical for each treatment group, any differences that existed between the two sets of recall texts had to be attributable to variables in the presentation phase, namely the listening and reading activities. In this way the differences could be interpreted as indications of differential operation of cue selection and message reconstruction as processes of listening and reading.

The inferential connections between the findings and the theoretical perspective from which processes in reading and listening were viewed form the subject matter of this section. They will be organized around the topics, length of recall texts, recalled ideas, importations, and findings from the informal analysis.

Length of Recall Texts

The fact that no overall quantitative difference between the two treatments was revealed for text length as measured by number of words or number of response units did not directly contribute towards an answer to the research question. Precision of reconstruction would not be revealed either by longer or shorter recall texts; it depended upon qualitative assessment of the texts. However, the finding was important because it indicated

that the qualitative differences revealed by the other findings could not be dismissed as mere functions of length. That is, it might have been argued that, if the reading groups' texts had been significantly longer than those of the listening groups, the differences in the number of recalled ideas, and types of recalled ideas could have been caused simply by the greater volume of recall. The finding that, in two out of the three schools, length was not a distinguishing factor added credence to the assertion that the qualitative differences revealed by other analyses were attributable to inherent characteristics of the two sets of recall.

The same reasoning, however, meant that the added credence was not available in the case of School C where a significant difference favouring the reading group was revealed. In view of this, some element of caution should be introduced into the interpretation of the findings. On the other hand, the fact that no hypothesis was rejected or accepted on the basis of a School C finding alone provided some safeguard against erroneous interpretations.

Another, somewhat tenuous conclusion might be drawn from the overall absence of significant length differences. In Chapter II it was stated that one assumption underlying the use of a written recall task was that reproduction in one medium did not bias the results of the study in favour of the same medium of presentation. Perhaps if the recall of the reading groups had been facilitated by the fact that they were required to write something they had already seen written, this would have been

manifested in longer recall texts in their cases. The absence of overall significant differences might have added some support to this assumption.

Recalled Ideas

The findings in this section referred to three aspects of the recall of explicitly stated ideas from the original discussion passages. These were the number of recalled ideas, the relationships between recalled ideas and other ideas and the meaning changes, or distortions, demonstrated by recalled ideas.

The overall findings in these three areas were that the reading groups' recall texts contained significantly more recalled ideas, recalled ideas which were presented in an appropriate relationship and non-distorted recalled ideas than the corresponding listening groups' recall texts. It was claimed that these findings about the recall texts could be related to the processes of listening and reading.

A recalled idea was an explicitly stated original idea that was discernible, with or without meaning distortion, in a recall text. Its recall was certain evidence that its original expression as an idea or statement was remembered. That it was remembered meant that the listener or reader had been able, from the auditory or visual cues available in its utterance, to select sufficient information to enable him to reconstruct that idea or statement in a form that was comparable to a degree with the original. Thus, to achieve a recalled idea indicated that a listener or reader had

reconstructed a version of an original idea which was recognizable as being an attempt to express that original. The absence of a particular original idea from a recall text did not indicate failure to process it; it might have been forgotten after being reconstructed. However, the presence of a recalled idea was nearly certain proof that a particular original idea had been successfully processed. Since there seemed to be no reason why listeners should be more prone to forgetting successfully processed ideas than readers, the finding that the reading groups produced, in two cases out of three, significantly more recalled ideas than listeners indicated successful processing of more original ideas.

Presumably the listeners tried to recall the same original ideas as the readers and the question was why did they fail to achieve as many? Perhaps they failed to understand as many. However, their recall texts, overall, were just as long as those of the readers so apparently they wrote just as many intended recalled ideas. A smaller proportion of their recalled texts must have contained actual recalled ideas and a correspondingly larger proportion must have contained material that failed to qualify as recalled ideas.

There was no abrupt, conspicuous division between recalled ideas and non-recalled ideas. Recall text material varied along a continuum from nearly identical expression of original ideas through degrees of veridicality to absolute contradiction. The definition of recalled ideas attempted to locate a cut-off point that was reliable and meaningful. On one side were discernible original ideas; on the other material that was too divergent to be recognizable.

In these terms, the recall texts of the reading groups contained more material towards the positive end of the continuum than the listening groups'. The listeners' attempts to express original ideas tended to be distributed further from the positive end and more frequently passed beyond the cut-off point. If this recall pattern truly reflected the processing of the ideas in the presentation stage as was argued in Chapter II, then the reconstructed versions of ideas produced by the processing systems of the listeners exhibited the same distributional tendency. They were distributed further along the continuum away from the congruent end. The reconstructions of the readers, on the other hand, possessed greater veridicality, or a closer degree of correspondence with the original ideas.

The finding, therefore, that the reading groups' texts contained significantly more recalled ideas than the listening groups' could be interpreted as evidence supporting an affirmative answer to the research question. The reconstructed ideas of readers appeared to be more consistent with and more recognizable as the original ideas as expressed in the written material than those achieved by listeners to spontaneous speech.

In Chapter II it was argued that both reading and listening were processes whereby input from the written or spoken texts was only one source of the information which a reader or listener used to reconstruct the message. In both cases his syntactic and semantic expectations as well as his knowledge of the subject matter of the discourse enabled him to predict the message at

several levels with only a sampling of the visual or auditory cues.

The finding that readers recalled more explicitly stated original ideas than the listeners can be interpreted as suggesting that the processes of cue selection and message reconstruction varied between the two receptive activities. The cues in the formal writing, being more consistent, coherent and less obscured by extraneous material than those in spontaneous speech, exercised a tighter discipline over the meaning reconstructions of the readers. The intended meanings of the writer were revealed more clearly allowing the reader less freedom in his reconstructions. The listeners, on the other hand, were relatively freer from the cues in the spoken input, and information from expectations and anticipations was relatively more significant.

Pursuing the concept of the continuum between perfect recall and reconstruction on the one hand and outright contradiction on the other, the adoption of a more conservative cut-off point further towards the positive end preserved and even strengthened the distinction between the two processes. The cut-off point this time was the definition of non-distorted recalled ideas. This was a more rigorous criterion for the crediting of a text with a recalled idea. Only restatements which did not result in significant meaning changes qualified as recalled ideas in this comparison between the two texts. The finding that for all three schools the reading groups produced more non-distorted recalled ideas than the listening groups could, by the same reasoning that was used in the case of general recalled ideas, be interpreted as

showing that the reconstructions of the readers were more disciplined by the text than those of the listeners.

The processing of continuous discourse is not simply a matter of reconstructing individual statements. It also involves reconstruction of larger patterns of meaning, relating individual ideas to each other. This is especially true of argumentative discourse. The analysis of the relationships displayed by recalled ideas was an attempt to compare reading and listening at this level of processing. The two groups' recall texts were compared in terms of the number of recalled ideas that demonstrated an appropriate relationship. That is this comparison included only those recalled ideas that were presented in the recall texts with evidence that their relationships with other ideas in the discussion had been understood. By this means, elements of overall processing of the discussion contents were introduced into the comparison.

Again the fact that the groups which read the material produced significantly more of this class of recalled ideas than did those which listened was further support for an affirmative answer to the research question. The larger meaning reconstructions of the readers more frequently resembled the structure of the original discussion content than those of the listeners. The readers' reconstructions were more sensitive to the constraints of the larger text than were the listeners'.

The findings, however, showed that these three recalled idea measures were far from independent of each other. Once it had been established that the reading groups produced more recalled ideas,

it would have been surprising if the other two analyses had not followed the same pattern. The finding related to non-distorted recalled ideas showed a more decisive difference between the two treatments when the more rigorous criterion for recalled ideas was applied. This, and the possibility of a similar trend for the relationship analysis, although it was not borne out, justified the two additional comparisons.

Two deviant relationships displayed by recalled ideas were also investigated, those presented in isolation without being apparently related to other ideational units, and those related to inappropriate material.

In this case the comparisons made were between proportions of recalled ideas that demonstrated each kind of deviant relationship. Since the number of each kind in a text was partly a function of the length of text, simply testing the difference between the group scores would have been misleading. The proportions of neither recalled ideas presented in isolation, nor those displaying an inappropriate relationship, were significantly different between the two treatments. This finding suggested that the difference between the two treatments with regard to relationships displayed by recalled ideas was a function of the number of recalled ideas in each, not of the proportions of each kind. That is, the proportion of recalled ideas that were either presented in isolation or in an inappropriate relationship was the same for the reading groups as for the listening groups. This suggested that the crucial difference between the two groups was that the readers had been able to recall more original

ideas, not that their recalled ideas were qualitatively different with respect to the relationship demonstrated.

Of course it should be acknowledged too that the definitions of the relationship categories were very weak. In order to achieve operational definitions, the criteria for classifying a recalled idea as a member of the appropriate relationship category was extremely lenient. Thus, the ability of the analysis at this point to reflect the true relationships among recalled ideas was very limited, resulting in a rather superficial comparison between the two sets of recall texts. For this reason the findings related to the two types of deviant relationship categories make confident interpretations about the processes of reading and listening impossible. At the level of relationships among recalled ideas investigated, there appeared to be no difference between reading and listening in terms of the processing of the interrelationships among ideas.

When the recall texts were compared on the basis of types of distortions demonstrated by recalled ideas, none of the four categories of distortion revealed a significant difference. This was an attempt to discover whether processing in one medium was different from the other in the type of meaning deviations manifested. However, all three defined types of distortion, key word changes, domain of application changes, and changes in the level of precision, as well as the residual type, were equally distributed over the two groups. Apparently, therefore, these types of distortion failed to distinguish between the processes of listening and reading. When either a reader or a listener reconstructed an idea, and in the

process distorted it, the medium involved did not apparently influence the type of distortion that resulted.

Importations

An importation was a response unit that constituted, or was part of, an unsuccessful attempt to express an original idea. Large percentages of the total response units in the recall texts of both readers and listeners fell into this overall category. There was an inverse relationship between recalled idea scores and percentage of response units that were importations. Recall texts that revealed higher scores for recalled ideas were more likely to produce lower percentages of imported response units. It was as though importations were the other side of the coin from recalled ideas.

In two out of the three schools, the percentage of response units that were importations was significantly higher for the listening group than for the reading group. This was tentatively accepted as a difference characterizing the two sets of recall texts.

What conclusions about the listeners' and readers' processing of the respective materials could be drawn from this finding? The concept of the continuum of correspondence between recalled material and original ideas referred to in the discussion of the findings related to recalled ideas could also be applied in this case. Importations represented unsuccessful attempts to express what the speaker or writer had presented. The attempts were not recognizable as recalled ideas; they lay beyond the cut-off point for recalled ideas. As a class they consisted of valid inferences, assumptions

and conclusions and consistent and inconsistent new information. The listeners produced proportionately more of these in their recall texts than the readers.

As discussed in Chapter II, the processes of remembering are themselves reconstructive. A subject does not remember the totality of an event; rather, features or details of it are remembered and these can be used to reconstruct the event according to rules of logic or experience. Undoubtedly some of the importations produced by both treatment groups arose from these memory processes. If one statement by the speaker was remembered, it could activate associations that could have been unstated inferences or consistent new information contributed by past experiences on the part of the listener or reader. In the writing of the written recalls, the listeners or readers could have believed quite reasonably, that such inferences and associations were actual statements by the speaker.

But again there would seem to be no reason why any systematic difference should have existed between the memory reconstructions of the listeners and the readers other than those arising from the presentation variable. Therefore the fact that listeners produced proportionately more importations than the readers had to be accounted for within the presentation phase. The difference, in other words, lay in the processes of cue selection and message reconstruction involved in the reception and interpretation of the spoken and written material.

The explanation could be that the readers were more clearly aware of what the explicit points made by the author were. The

listeners, on the other hand, given the more imprecise and diffuse linguistic input of spontaneous speech, could not as clearly distinguish the speaker's explicit points from a wider, general area of meaning which the spoken discourse aroused. This general area consisted perhaps of inferential meaning, or what the speaker implied but did not state; associative meaning, related ideas from the listener's own experimental background; and idiosyncratic meaning, deviant, inconsistent meaning reconstructions.

Another way to express this would be to say that the impact of information other than that directly derived from the input cues was relatively more influential in listening than in reading. The listener's expectations, derived from context and experimental background, played a relatively greater part in their selection of cues and in their meaning reconstructions causing them to include in their recalls a greater amount of material that did not correspond to original explicitly stated ideas. The readers' meaning reconstructions were more tightly under the control of the cues contained in the written text.

To put the argument in yet another way, it could be said that the reader appeared to be more stimulus bound in his reconstructions than the listener. Horowitz and Berkowitz (1967) made this point about the differences between spoken and written communication when they wrote of writing and reading as being "less natural, more artificial, more difficult, more stimulus bound" than speaking and listening (p. 214). The meaning which the writer intended was more clearly indicated by the cues he built into the

text. These cues demonstrated a greater consistency than those built into the spoken discourse by the speaker. In other words, the constraints upon the reader's reconstructions were relatively tighter and more restrictive; those imposed upon the listener were relatively looser, permitting greater divergence of meaning reconstruction.

That is not to say that spontaneous speech is an inferior medium of communication than writing. However, in cases where precision of meaning communication is involved writing would appear to have the greater potential for exact interpretation. Spontaneous speech, in cases where the listener cannot exert an influence upon the speaker by acting as an interlocutor, would seem to be liable to wider and, therefore, less precise interpretation.

This interpretation of the importation finding would suggest further affirmative evidence with which to answer the research question. It suggests that the processing of written language is more exact and more precise in the reconstructions that the reader achieves. Those of the listener to spontaneous speech are more diffuse, and drawn from a wider domain of meaning. The listener may know what the speaker meant; but the reader better knows what the author wrote.

There were no significant differences between the two groups in any of the proportions of either response units or imported response units that fell into each of the three importation categories. Thus, the overall importation difference could not be traced to any one of the three types of importation. It was again a question of total imported response units, not

individual types, distinguishing between the two sets of recall. Readers' and listeners' importations were distributed in similar proportions over logical inferences, assumptions and conclusions, consistent new information and inconsistent new information. With respect to these types of importation, listening and reading were, therefore, not significantly different.

Informal Analysis

Probing behind the main findings of the study, this analysis set out to evaluate the factors which were identified earlier as differences between the language of formal writing. It was an evaluation of the impact on processing of those factors. As reported in Chapter VI the findings were inconclusive with regard to the effects of extraneous material, syntactic deviance and semantic deviance. In some cases individual original ideas that were poorly recalled by the listening group compared to the reading group were attended by such factors as mazes, poor syntax or the use of inappropriate words in the oral version. However, in other cases the same factors did not result in an inferior performance by the listening group. Of course each of these factors probably varies in the degree of interference it causes in the structure or meaning of a sequence. The inconsistency might be attributable to this variation. On the other hand, the effects of these factors may not be limited or confined to the immediately contiguous sequence. The effects may be cumulative or may cause interference at other related points of the discourse. This analysis did not

attempt to document these possibilities. The only conclusion that could be drawn was that the effect of these three factors, extraneous material and syntactic and semantic deviance, did not appear to be simple and independent of other factors. They were not, individually, reliable predictors of poor recall. Therefore, it was concluded that, considered singly and broadly they did not constitute a consistent inhibitory effect upon processing.

In the case of operative deviance, the use of excessively long or complex structures, the finding appeared to be more consistent over two of the discussion topics. In these two cases such structures were uniformly poorly recalled by the listening groups. With the length and complexity modified in the written versions, the equivalent recall performance of the reading group was improved. The exception to this demonstrated by the respective groups which were exposed to the Hockey discussion was perhaps attributable to the relatively greater fluency of the speaker in that topic.

It was a finding in the pilot study that spontaneous speech contained a larger proportion of such operatively deviant structures than formal writing. This tentative finding from the informal analysis suggested that operative deviance is a factor which is involved in the processing differences between listening and reading. Its occurrence in spontaneous speech appears to inhibit processing of the ideas involved. It appears less frequently in writing, and in professional writing it should perhaps not occur at all. If a reader were to encounter a long or complex sentence

he could reread it. However, a listener has no recourse to this alternative. He must either impose an interpretation upon it or fail to process it fully.

The informal analysis revealed another specific source of recall difficulty, the use--particularly or even exclusively by spontaneous speech--of vague, indefinite anaphoric expressions such as the pronoun, "this". Consistent and often striking differences between recall performances on individual ideas were found in cases where this factor occurred in an oral version and had been eliminated in the written. It was concluded that the use in spontaneous speech of these vague anaphoric words whose reference was unclear or whose antecedents occurred much earlier in the text did make the ideas involved difficult to process with precision according to the speaker's intentions.

Conclusions Related to the Differences Between Reading Levels and Between Listening Levels

Reading and listening levels exerted a significant effect with respect to length of recall texts, number of non-distorted recalled ideas, and in the case of listening levels only, number of recalled ideas presented in an appropriate relationship. No consistent significant effects were observed for number of recalled ideas, percentages of recalled ideas displaying deviant relationships and percentage of response units that were importations.

It could be concluded that the volume of written recall

was to some extent a function of reading and listening ability. This conclusion was supported by the significant correlations revealed among these variables. Such a relationship was entirely predictable since reading, writing and listening abilities are interrelated as language functions. The finding that the variable, number of recalled ideas, was not significantly influenced by reading or listening levels, together with the correlational finding of significant but low relationships, indicated that the ability to recall and write down explicit ideas from a text listened to or read is not highly related to listening and reading ability as measured by standardized tests. As a measure of what is commonly referred to as reading and listening comprehension, the recall of explicit ideas would have low concurrent validity. The standardized tests used in this study employed a multiple choice format and in the case of the reading test the text could be re-examined in order to answer the question on the comprehension subtest. In a written recall task the subject has no extrinsic cues to assist his reconstructions and it is purely a task of recall not recognition as in the case of selecting answers from among multiple choice distractors. The different natures of the tasks, therefore, could account for absence of effects of reading and listening levels on this variable.

Summary of Conclusions

The differences between the recall texts of the listeners and readers were discussed in relation to the theoretical view of

reading and listening processes developed in Chapter II. Considering the two receptive language processes as subclasses of language processing, differences between the recall texts of the listeners and readers suggested ways in which listening and reading as language processing behaviours differed from each other. As processes involving cue selection and message reconstruction, the two varied with respect to the precision and exactness of meaning reconstructions achieved. Those of the readers were relatively more congruent with the explicitly stated ideas of the writer than the reconstructions of the listener were with those of the speaker. The listeners' reconstructions displayed relatively greater divergence from the apparent meanings of the text. This interpretation of the findings suggested that reading formal writing is different in degree from listening to spontaneous speech in the operation of the process principles of cue selection and message reconstruction. Reading is relatively more under the control of the cues contained in the text while listening is more susceptible to influence by information which the listener brings to the task-information from context and from expectancy derived from his syntactic and semantic predictions and from his knowledge of the subject matter.

Limitations of the Study

Chapter IV contained a discussion of the deliberate limitations imposed upon the study by the selection of the language registers to be investigated and of the subjects who served as

experimental samples. Both served to narrow the range of application of the results. The processes of listening and reading referred to in the study were those of grade eleven students confronted with argumentative discourse in the form of spontaneous spoken discussion and formal written discussion.

From the perspective of the completed study, other limitations should be emphasized. The first arose from the method of analysis used in Phase Two. The post hoc categories were developed without any empirical evidence of their validity as vehicles for the analysis of meaningful characteristics of the written recall tasks. Their validity rested upon logical evidence only.

Secondly, the relationship between the question under investigation and the data obtained from the analysis of the written texts also depended upon logical argument rather than empirical evidence. The process of reading and listening were not observed directly. Their differences were inferred from observations about one type of product of such processes.

Finally, individual subjects were not studied. The design of the study depended heavily upon randomization to control for individual differences in processing and recall. In so doing individual characteristics such as cognitive style, intelligence, socio-economic status, as well as a range of affective factors, were not observed.

Suggestions for Further Research

This exploratory study has tentatively identified a difference between the processes of reading formal writing and listening to spontaneous speech. It has suggested that one distinguishing characteristic of reading lies in the precision and exactness that formal written language imposes upon the reader's meaning reconstructions. As far as the design and perspective of the study are concerned, however, this difference was relative rather than absolute. The claim could not be made that reading was a matter of precise meaning reconstructions and that listening to spontaneous speech was a matter of imprecise ones. The evidence provided by this study merely suggested that reading involved a relatively more precise operation of two language processing principles--cue selection and message reconstruction--than listening to spontaneous speech.

In spite of this limitation upon the tentative finding, the difference between the two types of language processing suggested by this study would seem to have some significance and be worthy of continued research effort. Obviously a basic need is for confirmation or disconfirmation of the finding. Two types of verification would seem to be called for before the finding could be accepted as a distinguishing feature of reading. The first need is for a straightforward confirmation within the same registers of speech and writing that were used in the present investigation. This could be achieved by the use of different

language texts and subjects within a similar design and following similar analysis procedures. The second type of confirmation to be sought would be the extent to which the finding of the present study could be generalized to other writing and speaking registers. For example, it would be relevant to know whether the present study's finding was maintained when the comparison used narrative or descriptive text samples. Equally relevant would be an answer to the question of whether the relatively greater precision of reading reconstructions was sustained in comparisons between formal writing and other registers of speech, both spontaneous like monologue and conversation, or non-spontaneous like oral reading or recitation. Such a program of comparative research would perhaps indicate whether the finding from the present study was attributable mainly to the different nature of the two linguistic inputs involved or to channel variables as a whole.

Studies such as those indicated could employ the technique of written recall and the analysis categories developed in this present study. However, it should be acknowledged that the technique of written recall as a means of revealing listening and reading processes is cumbersome, prone to the deficiencies of reliability and its findings permissive of tentative interpretation only. Ideally, confirmation and extension of the present findings require the use of more authoritative and objective techniques. But in reality such techniques are not readily available.

Those that have proved valid and reliable in reading research such as the cloze procedure and eye movement and eye-voice span measurement cannot be used to study listening responses. This rules out their use in this type of comparative research. Remaining possibilities include introspection and retrospection which appear to be equally applicable to reading and listening. The problem with these techniques would seem to be the difficulty of ensuring that the subjects' responses were directed to the processing of the respective materials and not simply their reactions to the content. In other words, these techniques might not be fine enough instruments to distinguish between listening and reading at the level of their reconstructive processes. Perhaps a case study approach, investigating in depth the processes of a small number of subjects, would be productive.

A second general direction which further research could explore within this question of differences between reading and listening is that of the effects upon processing of the specific factors which were found to distinguish between formal writing and spontaneous speech. This study did not attempt to control these factors such as the presence in spontaneous speech of extraneous material, syntactic, semantic or operative deviance, and relatively weaker ideational structure. Laboratory-type studies could be designed to measure their impact upon the processing of speech and writing by listeners and readers. One approach might be to use short texts in both media where the spoken version

demonstrated one single characteristic of spontaneous speech, such as operative deviance, with the equivalent version having been rewritten to eliminate it. The reader and listener could be then required to identify the point made by the speaker or writer from a list of carefully developed alternatives demonstrating a range of interpretations. On the basis of the tentative conclusions of this present study, the hypothesis would be that the listeners in this situation would make a wider range of selections than would the readers. The effects of extraneous material, in differing degrees, of each type of linguistic deviance and of vague anaphoric expressions could be studied in this more objective manner.

It should be emphasized that the strategy used by the present study had only limited ability to reveal the unique characteristics of reading. One limitation, of course, derived from the fact that it was comparative research in which one activity, reading, was studied in relation to another, listening. The outcomes of such study can only be relative findings and conclusions which state how the target activity is the same as or different from the other. No absolute qualities can be discovered through this approach. Secondly, reading and listening were observed as sub-classes of language processing within a narrow definition provided by two human information processing principles. Since both reading and listening were therefore regarded within one generic definition, the discovery of generic differences between them was not possible. The suggestion must be made, therefore, that research

which attempts to reveal the unique characteristics of the reading process should adopt a different strategy and procedure from the ones used in the present study. These can reveal relative differences between the two activities; but the absolute qualities of each--differences in kind--are beyond their power.

Implications of the Study

The findings and conclusions from this study have implications for reading and listening research rather than for practitioners in the field. As an exploratory study, its findings were tentative and its conclusions dependent upon logical argument as well as upon empirical evidence. Rather than suggesting strategies for developing reading programs, the study should be seen as having indicated a potential source of differences between reading and listening as language behaviours. Any practical outcomes would be heavily dependent upon further research.

It should be emphasized that it was beyond the power of the present study to draw a line between listening to spontaneous speech and reading formal writing and claim that the line contributed to a definition of the domain of reading. The difference between the two was not a generic one because the two processes were compared and contrasted within a generic definition of language processing and within the single perspective of two principles of information processing. The most that could be achieved was that the two could be distinguished from one another in the

operations of the two principles. Any differences had to be differences of degree rather than kind. The differences actually revealed were differences in the degree of precision, exactness and textual discipline demonstrated by the respective reconstructive processes. In any absolute sense listening to spontaneous speech is not an imprecise, inexact or undisciplined process, nor is reading a precise, exact or disciplined one; one is simply more so than the other.

The implications of the findings, therefore were not significant for a definition of reading. The fact that reading appeared to involve greater precision and fidelity of reconstruction than listening could not be incorporated into a self-contained definition of the reading process. Nor did the results imply new components for a model of reading that would distinguish it from a model of listening. Apart from differences at the perceptual and decoding levels, a single model of language processing could accommodate the present conclusions.

While the study has not established that reading and listening, beyond their obvious differences, are different activities, it has suggested one way in which reading may make different demands than listening. Verification of this by further research would refute the argument referred to in Chapter I that reading and listening comprehension are essentially the same thing.

Concluding Statement

Language is produced in many different circumstances to satisfy a variety of purposes. This view of language implies that the receiver of linguistic messages must possess receptive language skills that are flexible and adaptable to the different situations in which he is exposed to language. This study has suggested one aspect of the flexibility required of a receiver who moves between listening to spontaneous speech and reading formal writing.

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APPENDIX A

PROCEDURES AND DEFINITIONS FOR THE ANALYSIS OF THE SPEECH AND WRITING SAMPLES

COUNTING THE NUMBER OF WORDS

The number of words in a text included both those spoken by the speaker and those spoken by the interviewer. Audible pauses and maze words were excluded from the texts before word counts were made. Filler words were included, not being considered "syntactically extraneous," following the procedure of O'Donnell, Griffin and Norris (1967, p. 39). Contractions such as "he'd" were counted as two words as were hyphenated words like "so-called." Spoken numbers were counted as the number of words uttered, "21", for example, being counted as two words. However, written numbers counted as one graphic symbol bounded by white spaces. If the number was written out in words, then the number of words was its count. For example, "twenty-one" counted as two words.

EXTRANEIOUS MATERIAL, OR "NOISE"

Audible Pauses

There were the "er" and "em" and other non-linguistic sounds that many speakers make in the course of their discourse. The distinction between these and the unstressed indefinite article, "a" was not always easy to maintain when one had to decide whether the speaker was repeating the article, producing a maze word, or making an audible pause like "er." In both cases the cause appeared to be similar - a search for the next word or idea. Other non-verbal sounds like coughs and laughs were not recorded on the transcripts.

Mazes

Essentially these were false starts, word tangles, and adjacent repetitions. In Hunt's study (1965) he used the term "extraneous matter"

(p. 6) to describe his garbles or mazes. Loban (1967) referred to them as "a series of words or initial parts of words which do not add up to a meaningful C-unit. Removal of the maze leaves an acceptable unit of language (p. 17)." In this present study words or initial parts of words were counted as mazes if:

1. they constituted an adjacent repetition.

examples: "I think that (that) the people will come to
to their senses."

"Students should take part in (extracurric)
extracurricular activities."

"The teachers (the teachers) are paid to come
to classes."

2. they constituted an incomplete construction abandoned by the speaker or writer in favour of an alternative syntactic pattern.

examples: "... because actually (we are) we do play an
independent role."

"I mean (it there there) our TV shows are
American."

3. they constituted a word or phrase replaced by another.

examples: "They do it under (false) the false pretense
that they are helping the student."

"(The teachers) the school board has a policy..."

4. they consisted of an incomplete construction that was abandoned or that just tailed away

example: "Should the teachers be made to come to classes
no matter how many students there are (or can the
teachers ...)"

Redundant subjects, which O'Donnell et al. (1967) included as mazes, were not treated as maze words in this study since it seemed to be a fairly common phenomenon to state a subject and then say something about it in a complete sentence. This may have been a stylistic feature rather than a feature caused by poor control over language.

example: "... but the petitions and such there's
so many of them being sent to government
officials ..."

Appositives, where both adjacent units were intended, were not included as maze words. Only in cases where the subsequent unit was obviously intended as a replacement for the original did the original constitute a maze word.

Filler Words

This class consisted of a small number of words or phrases - "well", "you know" and "like." The use of any one particular member of this set appeared to be idiosyncratic to individual speakers, some making exclusive use of "well," others of "you know" and yet others of "like." Other words and expressions, like "I mean", "say", or "now", appeared to have an emphasis function, and were not included as fillers. The following illustrate the use of fillers:

"Well, I think they should miss class when they want to."

"... it should be, you know, sort of an experimental,
you know, term..."

"That caused a transportation problem because like they
have to commute to the city every day."

PROCEDURES FOLLOWED IN THE T-UNIT ANALYSIS

1. Audible pauses were identified and marked.
2. Following the procedure described by Loban (1967, p. 12), phonological units were identified and marked. The end of a phonological unit was characterized by a pause together with falling pitch if it was a statement, or rising pitch if it was a question. A phonological unit, therefore, corresponded closely to a sentence and was used only to help identify the boundaries of T-units.
3. Working within the boundaries of the phonological units, the T-units were identified and their boundaries marked.

Some difficulties were encountered in this phase of the analysis:

1. In the case of some segments of text containing noun clauses as objects of verbs such as "say" and "feel", it was not always clear from the intonation, the syntax, or the sense of the text whether a second subordinate noun clause introduced by "and" was really a subordinate noun clause or whether it was a main clause. The following illustrates this problem:

"... and I'm not saying that alcohol is good but I am saying that we already have a dangerous drug, alcohol, on the market and we cannot afford at this time to put another one on such as marijuana."

The difficulty is with the clause beginning, "and we cannot afford ...". An arbitrary decision was taken to treat such cases as coordinated subordinate clauses. This may have contributed to the

unwarranted lengthening of oral T-units in a few cases.

2. In the dialogue situation there were instances of fragments and incomplete sentences which were either answers to questions or cases where the interlocutor was interrupted before he could finish a sentence. In both cases the resultant units were counted as T-units, since they did seem to represent complete units of communication given the preceding or succeeding context.
3. When a question was answered by either "yes" or "no", the problem arose as to whether this word was part of the T-unit which followed or a T-unit in itself. This question was decided on the basis of phonological evidence. If there was a pause and a drop in pitch after the word, it was counted as a separate T-unit, corresponding to "yes" or "no" followed by a period in written discourse. If, however, there was no pause and the pitch was sustained, the negative or affirmative was included as part of the succeeding T-unit. In this case the situation was assumed to correspond to the separation of the word by a comma from the succeeding text in written discourse.

APPENDIX B

INSTRUCTIONS TO JUDGES FOR LINGUISTIC DEVIANCE
ANALYSIS

SENTENCE ACCEPTABILITY

Attached is a list of sentences. You are asked to make a snap judgement about each sentence as to its acceptability in three dimensions: syntactic, semantic, and operative. To do this place a ✓ in the appropriate space in each column of the answer sheet. The terms syntactic, semantic and operative acceptability are defined below and examples are given.

Syntactic Acceptability refers to grammatically well-formed English sentences, irrespective of meaning. For example, the following are syntactically acceptable:

1. Metal fingers think carefully.
2. "Twas brillig and the slithy toves
Did gyre and gimble in the wabe."

However, the following are examples of syntactically unacceptable sentences:

3. The book are due over the library at.
4. Him and her is late.

Semantic Acceptability Examples 1 and 2 above are semantically unacceptable in the sense that they do not convey a clear meaning. However, examples 3 and 4 could be semantically acceptable since a meaning could be derived from each of them. Semantic unacceptability is caused by the use of inappropriate words or by the use of anomalous words as in:

5. The spinster is married.

Operative Acceptability An operatively unacceptable sentence is one which, although it could be syntactically and semantically acceptable, is excessively difficult to interpret either through length or grammatical

complexity. The following is an extreme example:

6. Anyone who feels that if so many more students whom we haven't actually admitted are sitting in on the course than ones we have that the room had to be changed, then probably auditors will have to be excluded, is likely to agree that the curriculum needs revision.

A sentence could be unacceptable in all three ways, in two ways, in one way, or in none of the ways. In the last case it would be a good English sentence.

APPENDIX C

TYPESCRIPTS OF THE ORAL VERSIONS OF THE
THREE STIMULUS PASSAGES

MENTAL ILLNESS

Interviewer: Today we have with us Ken Dunkley, a grade eleven student, who'll put forth his views on the facilities for mental illness. Em do you feel that the present facilities er for mental illness are sufficient?

Ken: Er no, I don't er because the facilities that we have are really archaic. A lot of them were built in the early nineteen er well nineteen-sixty, nineteen-fifty, nineteen-forty and they're outdated. They're facilities are more like prisons than the actual treatment centres. They're too large. There's not enough psychiatrists for the patients. It's too large, too mass-production scale where we cannot achieve a cure in this type of atmosphere.

Interviewer: Well do you feel that er any progress is being made as to remedy this?

Ken: Er yes, the Blair Report, brought out by the last Conservative er Social Credit government did a lot to recognize this problem, but the government didn't really didn't do anything to alleviate it. It brought out points that I feel are rather important, em one of which is the fact that small institutions are a lot better for treatment than the large institutions. We can get er tighter family units they called it and much more progressive and intensive care. You can rehabilitate the mentally ill person a lot faster, a lot better with a lot better results.

Interviewer: Do you feel that er there are very er many are there enough as well as them being sufficient?

Ken: Em there aren't. There are a few rehabilitation homes, but those are only for ex-patients which really em are very very small. There's only three or four in Edmonton and that is not very large enough for the number of patients that could be put into them.

Interviewer: Well these the present facilities, those that are have sort of a little bit outdated, are they em are they doing any good? Are they benefitting the patients?

Ken: Well sort of because they the patients who are not really institutionalized yet who just go in there for short-term em cures or or to alleviate their problem over a short period of time do not really become very institutionalized, and institutionalization is one of the major problems that you get. You get people in there twenty thirty years em in hospitals in these hospitals and this is this develops a very strict form of institutionalization and the patient might be cured but you cannot see it because the development of institutionalization in those places is to such a great extent that it masks all forms of recovery.

Interviewer: Er do these facilities er help place people that are perhaps partially em aided or cured by these by treatment? Do they help place them when once they get out?

Ken: Em well Canadian Mental Health Association is er an association which was formed to help the patient once he was out of hospital and the patients in hospital and they do follow up with after-care. But the

hospital doesn't really do all that much. They try to do as much as they possibly can, but it's a terribly neglected area as far as doctors and staff as well.

Interviewer: Do they have the facilities that take care of say permanent residents, people that'll perhaps em

Ken: Never be cured?

Interviewer: Yes, well perhaps have to remain there?

Ken: Well the people that nobody is really incurable as far as er it's just the time that it takes to cure them they might die before it comes about. It's an emotional unstab inst incapacity or stability and em a person with the lack of stability will be more likely to become mentally ill. Therefore the institution does keep people in there for a long length of time, sometimes too long, usually too long. But there's no real requirement or area for people who are in there for let's say senile people who will be in there till they die. There's a they're sort of brushed aside because medicine can't do all that much for them.

Interviewer: Well as well as development in the facilities themselves, do you feel that there's any been any progress in er well just general treatment?

Ken: Em general treatment has gone up just in within the past few years with the recent discovery of new drugs that alleviate problems. We used to consider people such as epileptics being mentally ill because they threw these fits at uncontrolled times and they seemed like they could be brought about by too much action activities and things like that.

And they'd throw a fit and they'd think, "aha, this person's mentally ill," which he wasn't. Now they've got drugs to control that.

Interviewer: So that in general you feel that there has been progress made in both the field of er cure and the facilities that er aid this cure?

Ken: Yes, I do. It's er very advancing rather slowly but progressing very strongly.

Interviewer: Thank you.

THE UNITED NATIONS

Interviewer: Just recently Nationalist China was expelled from the United Nations in favour of accepting the People's Republic of China. We have here today Mauro Cimelli who is very knowledgeable on this situation and we'd like to know some of your views Mauro. Was it justified to expel Taiwan?

Mauro: I think it was justified if we look at it from the view of what the United Nations is there for and em what it's setting out to do. Em the United Nations is originally was intended to be a peace-keeping body and em it's you know performed this function to er a certain extent a even limited extent during the past ever since it was formed and one of the reasons why it can't be totally effective in the past was because it did not have really the whole world em population or the er complete representation of the world powers within its sort of em you know its format or its em assembly to deal with with the world problems. Now er Communist China has a population of about 750 million and it makes very little sense em to leave this this such a large size of people out of such an important peace-keeping organization as the United Nations.

Interviewer: Well I would agree with this. I think they should have been allowed to come in but what I'm trying to get across, or trying to ask, is is it justified to throw Taiwan out? Like why recognize Communist China and not Nationalist China?

Mauro: Yes. Well the problem has been there for quite a while and the problem really stems from em Communist China. Em Communist China does

not want to be in the United Nations with Taiwan and that's where the problem starts. If Taiwan and Communist China could be in the United Nations together and you know be at least amiable in some respects I mean not at each other's throats this would be fine but Communist China has made it definitely clear that it will not be in the United Nations with Taiwan and so the choice boiled down to do we either take Taiwan into the picture or do we take Nationalist China and er excuse me or do we take Communist China in view of such a large proportion of the world's population it holds in comparison to what Taiwan holds which is you know really very small when you look at the whole picture.

Interviewer: Well I'd have to agree with this, but I also want to know do you think when United Nations made this decision they were thinking of what you just explained? Or do you think, as many people do, that this vote was actually a protest to the United States? Everybody knew that the United States rigidly backed Taiwan.

Mauro: Well, em on your first comment, the United States did not make the decision. Em you know that they opposed it originally and they tried to develop as much opposition to this as possible. Now the reasons for this are many, and I suppose we can't really get into er get into them and say this is exactly what happened because we er are not em totally aligned with the political and economic aspects and everything else that becomes involved. But em United Nates er the United States excuse me, as a world power em definitely would try to maintain this this world superiority as long as it could. Now we have to recognize this, I feel, that China is a definite potential as a world power and that this potential has not developed yet, and one of the ways that this potential

would be developed would be to get United er em Communist China into such organizations as the United Nations. Em I don't think that this was a deliberate maliced attempt by the United States to keep em Communist China out em in terms of you know a .. along the idea that they just did not want to recognize Communist China at all, but they wanted to suppress it completely, but I don't think they were quite yet ready to accept another communist power into the United States as this would re .. em upset the balance, I feel.

Interviewer: Right, sir. Well let me phrase my question a little bit differently. Do you feel that there was malice against the United States by the other nations in protest to what you've just described?

Mauro: Em no, it's hard to say. It's a very hypothetical question. I would say perhaps in some cases there was em a form of malice towards the United States. I mean the communist nations might have been em form you know might have s... had somebody come promote the idea that they should try to suppress the United States' ideas er and philosophies. Em I don't think we can talk about this malice, er this this idea of malice between the two powers in such a body as the United Nations though.

HOCKEY

Interviewer: Many people concerned with the standard of competitive sport in today's world, are of the opinion that there is a definite breakdown in the standard of ice hockey in both the national and international leagues. With us here today is Dan Ryan, a grade eleven student, who has some rather strong views on this subject. Em Dan, what do you mean by saying that the quality of ice hockey is breaking down? Could we er start with the national league, please?

Dan: Well, when I say the quality of ice hockey of the national hockey league is breaking down, I simply mean it's not as good as it used to be.

Interviewer: Well, in what respects is it not as good?

Dan: Well, the calibre of play is not as good as it was four years ago. The type of hockey, the er fast-skating, the accurate passing, the sharp-shooting game, as long as as well as really competitive game seems to be gone in today's league.

Interviewer: Well, how do you account for this?

Dan: Well, the main factor uh that we can attribute this to is er the is the watering down of the league. Say for example four years ago there was expansion which brought in six new teams. Now the old division teams like Montreal, Chicago, Boston etc. had their choice of top drafts every year so they maintained a constant superstar league so to speak. But when they brought in these other six teams they not only drafted from the old teams but they got the top choices. So with more teams involved,

the calibre of hockey went down, although the participation in the sport sort of increased.

Interviewer: I understand. But do you feel that the breakdown as you've outlined it here is a necessary evil or I mean you know does it have to be an a detrimental factor?

Dan: Well I consider it detrimental as a fan because I do not see the calibre of hockey I used to see. I do not enjoy the games as much as I used to. Now speaking for the old clubs the fans recognize this and are disappointed. However the new clubs, the ignorant fans enjoy this type of hockey because they've never known any other type. Er I think what you're trying to say is that the quantity of hockey played like the more people involved determines the calibre and I say that that's not right. I will not sell quality for quantity.

Interviewer: In general, do you feel that sports should be competitive that people should participate in in this sense or do you feel that the sport is there er mainly as er for people to observe.

Dan: Well, I feel that the sport is for sport er in general for people to participate. However er the national hockey league is a job for these players and their pay so to speak or their take home revenue is determined indirectly by the number of fans they get in the different stadiums. Now at present they're maintaining a number of fans. However er last year they brought in two more teams. This year they're bringing in an additional two. Now I shall predict and this is my own personal opinion, that in the old clubs the fans will start to diminish. There won't be as many fans coming. And once that happens

they may take the franchises from the old clubs and redistribute them among the new clubs.

Interviewer: Well, do you feel that er now there's more clubs don't you feel that in a few years the standard will raise itself?

Dan: Er no, I I don't feel that at all. I feel that there are not enough good top-notch hockey players that will go around for sixteen teams and now that the World Hockey League is being introduced next year, making the number of teams thirty-two, I cannot feel that there will be anywhere near enough players for good competitive sport for thirty-two teams.

Interviewer: So in other words you don't feel that the past er standard of hockey with action we've had in the past will likely come back as long as we have this enlargement league.

Dan: No I don't feel that and I feel also that the enlargement league would not last that it will break up into divisions and eventually the six old clubs will be reinstated. But by that time the calibre of hockey may be so low that they may not be able to get back on their feet.

Interviewer: I guess we can see that in the formation of a new league out in the West now I suppose that's just more people trying to divide up the league and try to bring back a smaller number of teams in the league.

APPENDIX D

WRITTEN VERSIONS OF THE THREE
STIMULUS PASSAGES

FACILITIES FOR THE TREATMENT OF MENTAL ILLNESS

Interviewer: Ken Dunkley, a grade eleven student, is concerned about the facilities that are available for the treatment of mental illness. Ken, do you feel that the existing facilities for the treatment of mental illness are sufficient?

Ken: I really don't think they are. The facilities that we have are archaic, many of them having been built in the 1940's, the 1950's and the 1960's. They are more like prisons than centres for the treatment of mental illness. They are too large and there are not enough psychiatrists for the number of patients. With these kinds of large-scale facilities and this mass-production atmosphere, it is very difficult to achieve a cure.

Interviewer: Do you feel that any progress is being made to remedy this state of affairs?

Ken: The Blair Report, brought out by the last Social Credit government, helped people to recognize the problem, but the Government did not follow up with any action to alleviate the problem. The report brought out some points which I think are very important. One was the fact that small institutions are able to offer better treatment than large ones since they encourage what is called a tighter family unit and provide more progressive and intensive care. In small institutions, you can rehabilitate the mentally-ill person much more quickly and effectively.

Interviewer: Do you feel that there are enough of these institutions?

Ken: There are not enough. There are a few rehabilitation homes which look after ex-patients. There are only three or four of these places in Edmonton which is not enough to serve the number of people that could benefit from them.

Interviewer: Do the existing, outdated facilities benefit their patients at all?

Ken: They can benefit the short-term patient, the person who spends a brief period of time in the institution. These short-term patients do not become institutionalized. This institutionalization is one of the major problems when you have people in these hospitals for twenty or thirty years. Although such a person might be cured, you cannot see the cure because the recovery is masked by the development of institutionalization in the patient.

Interviewer: Do these facilities help place patients who leave when they are partially cured by the treatment?

Ken: The Canadian Mental Health Association is an organization which was formed to help patients both while they are in hospital and when they leave. This association does follow up with after-care, but the hospitals themselves do not do very much. Although they try to do as much as they can, this is a very neglected area with too few doctors and staff involved in it.

Interviewer: Are there facilities for the care of permanent patients, those people who perhaps will never be cured and who have to remain in the institution?

Ken: No one is really incurable. It's just a question of the time it takes to achieve a cure. In some cases the patient will die before he can be cured. Mental illness is a question of emotional instability or incapacity and a person who lacks this stability is more likely to become mentally ill. Therefore the institution does keep some people for a long time, and usually this period of time is too long. There is no special treatment or special area for patients such as, for example, senile people, who will be in hospital until they die. They tend to be brushed aside because medicine cannot do very much for them.

Interviewer: Apart from development of the facilities themselves, do you feel that there has been any progress in the general treatment of mental illness?

Ken: General treatment has improved with the recent discovery of new drugs with which to treat some forms of mental illness. For example, we used to consider epileptics as being mentally ill because they threw fits when it seemed they were over-stimulated. Now there are drugs which can control this condition.

Interviewer: In general then, you feel that there has been progress made both in the treatment of mental illness and in the facilities in which this treatment is provided.

Ken: Yes, I do. I think that although progress is slow, it is strong progress.

CHINA AND THE UNITED NATIONS

Interviewer: Just recently Nationalist China, or Taiwan, was expelled from the United Nations, and her place was taken by the People's Republic of China. With me is a grade eleven student, Mauro Cimelli, who is well-informed about this topic. We would like to know what your views are, Mauro. Was the expulsion of Taiwan from the United Nations justified?

Mauro: If we look at it from the point of view of the purposes and aims of the United Nations, I think the expulsion was justified. The United Nations was originally intended to be a peace-keeping body, and it has carried out this function to a certain, limited extent since its formation. One of the reasons why it has not been completely effective in its role in the past is that it has not represented all the nations of the world. All the world powers have not been included in its Assembly where world problems are discussed. Communist China has a population of 750 million people, and it makes very little sense to have such a large nation excluded from an important peace-keeping organization like the United Nations.

Interviewer: I agree that Communist China should have been allowed to join the organization, but my question is really whether the expulsion of Taiwan was justified. Why should Communist China be recognized at the cost of excluding Nationalist China?

Mauro: This problem has existed for some time. It stems from the fact that Communist China did not wish to join the United Nations as long as

Taiwan was a member. If both Communist China and Taiwan could have been members at the same time, with some agreement between them and without hostility, then there would not have been a problem. However, when Communist China made it perfectly clear that she would not sit in the United Nations while Taiwan was a member, a choice had to be made between them. I think that the choice of Communist China was justified in view of the large population that it represents. In comparison to this, Taiwan's population is very small.

Interviewer: I have to agree with you. However, do you really think that the United Nations, in making this decision, was influenced by what you have just explained? Or do you think, as many people do, that the United Nations' vote to admit Communist China was intended more as a protest against the United States? Everyone knows that the United States firmly supported Taiwan.

Mauro: With regard to your first point, the decision was not made by the United States. The United States opposed Communist China's admission at first, and it tried to promote as much opposition to it as possible. We cannot say for certain what the United States' reasons for this were since we do not have all the details of the political and economic aspects of the policy. However, the United States as a world power would certainly attempt to maintain its position as a world leader as long as it could. We must recognize this motive. China is potentially a world power, and joining such organizations as the United Nations would be one way to develop this potential. I don't think that the United States' opposition to Communist China's membership was a deliberate, malicious attempt to

keep China out. It did not mean that they did not want to recognize Communist China or that they wanted to hold it back completely. I think they were not ready to accept another communist state into the United Nations as this would have upset the balance of power.

Interviewer: Let me put my question another way. Do you feel that the other nations were being malicious towards the United States? Were they reacting against the policy you have just described?

Mauro: That question is very difficult to answer. It is a hypothetical question. Perhaps in some cases nations were being malicious towards the United States. The Communist nations might have tried to promote opposition to the American policies. However, I think that "malice" is not an appropriate term to use in discussing the relationships between two major powers in a body such as the United Nations.

THE STANDARD OF HOCKEY

Interviewer: Many people, concerned with the standard of competitive sport, believe that the quality of national and international hockey has declined. Dan Ryan is a grade eleven student who has strong views on this subject. Dan, what do you mean when you say that the standard of hockey in the National League is declining?

Dan: When I say that the standard of hockey in the National League is declining, I simply mean that it is not as good as it used to be.

Interviewer: In what respects is it not as good?

Dan: The calibre of play is not as good as it was four years ago. The older type of hockey with its fast skating, accurate passing, sharp shooting, and competitiveness seems to have disappeared from the present league.

Interviewer: How do you account for this?

Dan: The main reason for this decline in standard is the dilution of the league. Four years ago expansion brought in six new teams. Before this, the original teams like Montreal, Chicago and Boston had their choice of top drafts every year. This resulted in a "superstar" league. With the introduction of six new teams, the original clubs lost some of their players, and some of the top draft choices went to the new clubs. Thus, with a larger number of teams involved, the overall calibre of hockey has gone down. However, participation in the sport has been increased by the addition of new teams.

Interviewer: Do you feel that this decline in standard is necessarily a detrimental thing for hockey?

Dan: As a hockey fan I do consider it detrimental because I no longer see the calibre of hockey that I used to, and, consequently, I do not enjoy the game as much as I used to. The fans who support the original National Hockey League teams recognize this decline in standard too, and they are disappointed. However, the fans who support the new teams, especially the inexperienced American fans, do enjoy the hockey they see today because they have never known the other kind. I don't agree with you if you are saying that the calibre of hockey is determined by the quantity of hockey played or the number of people involved in it. I believe that the quality of the game, not the quantity, is the most important thing.

Interviewer: In general do you think that sports should encourage competition and participation, or do you think they exist for people to observe as spectators?

Dan: In general, sport is for people to participate in. On the other hand, for the players in the National Hockey League the game is a job. Their pay is determined indirectly by the number of fans attracted to the stadiums to watch the games. At present the number of fans is holding up. However, last year two new teams were added to the League, and this year two more will be admitted. I predict that the old, original clubs will experience a decline in fan support. This might lead to these older clubs losing their franchises.

Interviewer: With expansion of the number of teams in the league, there is now a greater demand for hockey players. Do you feel that within a few years this increased demand will lead to improvement in the standard of hockey?

Dan: I don't believe it will. I feel that there are not enough top-quality hockey players available to stock the sixteen teams in the League. The introduction of the World Hockey League next year will raise the number of teams to thirty-two. This makes it even less likely that there could be enough players available to produce good, competitive sport.

Interviewer: In other words you feel that the old standard of action hockey is unlikely to return as long as we have this enlarged League.

Dan: I do not feel that it will. I also feel that the enlarged League will not last, but that it will break up into divisions. Then eventually the six original clubs will be reinstated. However, by that time the standard of hockey might be so low that they might have great difficulty getting established again.

Interviewer: Perhaps the formation of a new league in the West demonstrates this process. There we have hockey being divided up into smaller leagues, each with a smaller number of teams.

APPENDIX E

INSTRUCTIONS RELATED TO THE COLLECTION OF THE
WRITTEN RECALL DATA

INSTRUCTIONS TO TEACHERS

It is important that testing situations should be as equivalent as possible for each class. Thus, it would be appreciated if you would help to achieve this by following these steps and procedures exactly as stated.

1. Distribute the INSTRUCTIONS TO STUDENTS sheet. (SET A)
2. Distribute the three page article. Instruct the students to leave it face down on the desk until told to begin reading.
3. Read the instructions to students aloud to the group slowly with the students reading their copies silently.
4. Ensure that each student has a pen or pencil in working order.
5. After reading the instructions aloud, instruct the students to turn over their papers and begin reading. Remind them to read carefully at their normal speed and to read the material ONCE only.
6. As the students finish, remind them individually to turn their papers over, and distribute the answer sheets - one sheet to each student - and a copy of the second set of instructions. (SET B)
7. When everyone is finished reading, read aloud the second set of instructions and tell the students to begin. They may write on both sides if necessary.
8. Before collecting up the completed answer sheets, ensure that each student has put his name on his answer sheet. DO NOT COLLECT ANY ANSWER SHEETS UNTIL ALL HAVE FINISHED.
9. Collect also all copies of instructions and reading materials.

Thank you very much

INSTRUCTIONS TO STUDENTS IN THE READING GROUP (SET A)

The purpose of this exercise is to find out how well students can understand a point of view presented as a written dialogue or discussion. You will read a short discussion between two students, like you in grade eleven. One student acts as interviewer, questioning the other on his views on a particular issue or question. While you are reading try to understand what the student's views are and how he supports them with facts, information and arguments.

After you have finished the reading, you will be given a task designed to reveal your understanding of the views and arguments presented in the discussion. Remember this is not a test situation that will affect your grades or marks in any way. Try to do your best, but approach the exercise in a relaxed way.

Read the discussion carefully as you would any other reading assignment. Read at your normal rate. Read through the discussion ONCE only. Read it through once and turn the paper over when you have finished reading. You will be given instructions after the reading is completed.

INSTRUCTIONS TO STUDENTS IN THE LISTENING GROUP (SET A)

The purpose of this exercise is to find out how well students can understand a point of view presented as a videotape discussion. You will see a short discussion between two students, like you in grade eleven. One student acts as interviewer, questioning the other on his views on a particular issue or question. While you are watching, try to understand what the student's views are and how he supports them with

facts, information and arguments.

After the video is finished you will be given a task designed to reveal your understanding of the views and arguments presented on the video.

Remember, this is not a test situation that will affect your grades or marks in any way. Try to do your best, but approach the exercise in a relaxed way.

WRITTEN RECALL INSTRUCTIONS TO STUDENTS
IN BOTH GROUPS (SET B)

To show how well you understood the speaker's views, write down all that you can remember of what he said. Write in normal, connected sentences and paragraphs.

Don't worry about remembering the exact words spoken. It is perfectly all right to use your own words to reproduce the speaker's views and arguments. You are not expected to remember everything that was said - probably no-one could. Simply do the best you can by recalling as many ideas and details as possible.

Remember, write in normal, connected English.

WRITE LEGIBLY You have as much time as you need. Write your name at the top of the answer paper.

APPENDIX F

LISTS OF ORIGINAL EXPLICITLY STATED IDEAS
FROM THE THREE STIMULUS PASSAGES

MENTAL ILLNESS:

- A
1. Existing facilities for the treatment of mental illness are insufficient.
 2. The facilities that we have are archaic.
 3. Many of them were built in the 1940's, 1950's and 1960's.
 4. They are more like prisons than treatment centres.
 5. They are too large.
 6. There are not enough psychiatrists for the number of patients.
 7. The large-scale facilities and the mass-production atmosphere makes it very difficult to achieve a cure.
- B
1. The Blair Report brought out by the last Social Credit government helped people to recognize the problem.
 2. But the government did not follow up with any action to alleviate the problem.
 3. The report brought out some important points.
 4. One was that small institutions offer better treatment than large ones.
 5. Because they encourage a tighter family unit.
 6. Because they provide more progressive and intensive care.
 7. In small institutions you can rehabilitate the mentally ill a lot faster and a lot better.
- C
1. There are not enough of these institutions.
 2. There are a few rehabilitation homes which look after ex-patients.
 3. There are only three or four in Edmonton.
 4. This is not enough for the number of people who need them.

- D
1. Existing facilities can benefit short-term patients.
 2. They do not become very institutionalized.
 3. Institutionalization is one of the major problems when you have patients in these hospitals for twenty or thirty years.
 4. You cannot see when such patients are cured.
 5. Because recovery is masked by the development of institutionalization.
- E
1. After care is a neglected area.
 2. The Canadian Mental Health Association was formed to help patients and ex-patients.
 3. It does follow up with after care.
 4. Hospitals themselves do not do very much.
 5. There are too few doctors and staff involved in this area.
- F
1. No patient is incurable.
 2. It's just a question of the time it takes to cure them.
 3. They might die before the cure comes about.
 4. Mental illness is a question of emotional instability or incapacity.
 5. A person who lacks this stability is more likely to become ill.
 6. Therefore the institution does keep people for a long time.
 7. This period is usually too long.
 8. There is no special treatment or area for people such as the senile.
 9. They will be in hospital until they die.
 10. They tend to be brushed aside.
 11. Because medicine cannot do very much for them.

- G
 - 1. General treatment of mental illness has improved recently.
 - 2. Because of the discovery of new drugs with which to treat mental illness.
 - 3. For example, epileptics used to be considered as being mentally ill.
 - 4. Because they threw fits when they were overstimulated.
 - 5. Now there are drugs which can control epilepsy.

- H
 - 1. Progress in treatment and facilities is strong.
 - 2. Although this progress is slow.

THE UNITED NATIONS:

- A
1. The United Nations was originally intended to be a peace-keeping body.
 2. Its success has been less than complete.
 3. Because not all nations were represented.
 4. Communist China has a population of about 750 million people.
 5. Such a large country should be in a peace-keeping organization like the United Nations.
 6. The problem has been there for quite a while.
 7. Communist China did not want to join the United Nations as long as Taiwan was a member.
 8. If they could have both been in the United Nations together there would have been no problem.
 9. So the United Nations had to choose.
 10. China has a much larger population than Taiwan.
 11. So the choice of Communist China was justified.
 12. The expulsion of Taiwan was justified.
- B
1. The decision to admit Communist China was not taken by the United States.
 2. They opposed her admission originally.
 3. And they tried to develop as much opposition to it as possible.
 4. We cannot be sure what the United States reasons for this were.
 5. We do not have all the political and economic details of her policy.
 6. However the United States would wish to maintain her position as a world power as long as she could.

7. Communist China is potentially a world power.
 8. To get into the United Nations would be one way to develop this potential.
 9. The United States opposition was not a deliberate, malicious attempt to exclude Communist China.
 10. It did not mean that they did not want to recognize Communist China.
 11. Or that they wanted to suppress it completely.
 12. They were not ready to accept another Communist power into the United Nations.
 13. Because this would have upset the balance of power.
- C
1. The question of whether there was malice against the United States by other nations is hard to answer.
 2. It is a hypothetical question.
 3. Perhaps in some cases nations were being malicious.
 4. The Communist Nations might have tried to promote opposition to United States policies.
 5. However malice is not an appropriate term to use in discussing the relationships between two powers in such a body as the United Nations.

HOCKEY:

- A
1. The standard of hockey in the National League is going down.
 2. The calibre of play is not as good as it was four years ago.
 3. The older type of hockey with its fast skating, accurate passing, sharp shooting and competitiveness seems to have gone from today's League.
 4. The main reason for this is the dilution of the League.
 5. Four years ago expansion brought in six new teams.
 6. The original teams had their choice of the top drafts every year.
 7. This maintained a kind of "superstar" league.
 8. When the six new teams came in, the original clubs lost some of their players.
 9. Some of the top draft choices went to the new teams.
 10. The overall calibre of play has declined.
 11. Because there are more teams involved.
 12. Although participation in the sport has increased.
- B
1. As a fan I consider the decline in standard to be detrimental.
 2. Because I don't see the calibre of hockey I used to see.
 3. I don't enjoy the games as much as I used to.
 4. Fans of the old clubs recognize this decline.
 5. And they are disappointed.
 6. However, the fans of the new clubs, especially the Americans, enjoy this type of hockey.
 7. Because they've never known the other kind.
 8. I don't agree with you if you are saying that the calibre of hockey is determined by the quantity played.

9. I believe that quality not quantity is the important thing.

- C
1. Sport in general is for people to participate in.
 2. But for National Hockey League players the game is a job.
 3. Their pay is indirectly determined by the number of fans who come to the games.
 4. At present they are maintaining their fan support.
 5. Last year they brought in two more teams.
 6. This year two more will be admitted.
 7. The fans of the old clubs will decrease.
 8. This might lead to their franchises being taken away.

- D
1. I don't believe that the increased demand for players will lead to an improvement in the standard.
 2. There are not enough top-quality players to go around for sixteen teams.
 3. The introduction of the World Hockey League next year will raise the number of teams to thirty-two.
 4. This means there will not be anything like enough players to produce good competitive sport.

- E
1. I don't feel that the old standard will ever return while we have this enlarged league.
 2. I feel that the enlarged league will not last.
 3. It will break up into divisions.
 4. Eventually the six original clubs will be reinstated.
 5. However by then the standard might be so low that they might have great difficulty establishing themselves again.

- F 1. Perhaps the formation of a new league in the West demonstrates this process.
2. We have hockey being divided up into smaller leagues.
3. Each with a smaller number of teams.

APPENDIX G

DEFINITIONS AND PROCEDURES FOR THE ANALYSIS
OF THE WRITTEN RECALL TEXTS

INTRODUCTION

These detailed procedures and definitions for the analysis of the written recall texts were those used in the training of the judges who participated in the reliability analyses. They have been modified to better accommodate a written presentation and several model analyses of recall texts are included. This appendix has been designed to help any reader to train himself in the application of the categories.

Discussion components and recalled ideas are presented first, followed by relationships among recalled ideas and then by distorted recalled ideas. Next comes a detailed description of the response unit segmentation, a necessary preliminary step in the importation analysis with which the appendix concludes.

DISCUSSION COMPONENTS

As a starting point the ideas from the original texts have been listed in order and grouped according to "discussion components". These are parts of the original discussions dealing with one aspect of the topic. A discussion component represents those ideas presented by the speaker as an answer to one of the interviewer's questions, except that in some cases two closely related questions and the material given as answers were treated as one discussion component. These components are marked on the lists of original ideas by a letter designation (Appendix F).

RECALLED IDEAS

The first analysis procedure is to locate original ideas in the written recall texts and then to categorize each recalled idea according to the list of categories and definitions that follow. In this way, all the ideas in the recall texts that can be traced directly to an explicitly stated idea in the original will be identified. For the moment other parts of the written recall texts will be disregarded.

Description of a Recalled Idea

If an idea from the list of significant ideas is discernible in the recalled text, it is called a recalled idea. A recall text is credited with a recalled idea if it is felt that some information in the recalled text is an attempt to express an explicitly-stated original idea.

Information in the written recalls is of several different types:

1. recalled explicit ideas
2. recalled inferences, valid but not explicitly stated in the original
3. imported ideas, new information not derived from original text
4. contradictory statements
5. vague references to topics
6. descriptive comments about interview
7. evaluative comments about interview and speaker's ideas

8. repeated ideas

The task is to decide which information is Type One, recalled explicit ideas. The unit in the recalled text does not have to be specified--it could be a sentence, a clause or a phrase. It could even be more than one sentence. If it is felt that the writer was attempting to express information that he recalled from an explicitly stated idea, that original idea is a recalled idea credited to that recall text.

While the explicit statement of inferences from the original text is called importation and not counted at this point, in some cases a writer may make a statement which shows that he recalled the original idea although this may be expressed by inference rather than by direct restatement. For example:

ORIGINAL IDEA	RECALLED IDEA
(M. I. B5) And they (the fans) are disappointed (about this decline in calibre)	Because of their disappointment, the fans may stop going.

In cases like these where the writer shows that he must have understood the original idea, the recalled text is credited with that recalled idea.

In some cases two or more original ideas may be similar in meaning in which case assignment to the specific original idea may be difficult. In cases like this use key words and surrounding context to help decide the one. Information should not be assigned to more than one original idea.

In many cases the presence of an original idea will be quite clear. There will, however, be difficult cases because when ideas

are expressed in paraphrase they are liable to distortion. In cases of difficulty the following procedure might be helpful:

1. Ask yourself, "Did the information that the writer has expressed come from a particular, explicitly-stated idea on the list of original ideas?" If "no" because the information was implied by the original text or because it is completely new, it is not a recalled idea.
2. Ask yourself, "What clues are there to help match the recalled information with an original idea?" These might be:

topic

key words

statement about the topic

context--ideas surrounding the information
in question

form

3. Ask yourself, "Is the statement which the writer has made about the topic recognizable as the original idea or is the statement made by the original idea implied by the statement made by the writer.

If the answer to Question 3 is "yes", in spite of incomplete original meaning, additions of meaning, loss or gain of precision, wider or narrower meaning, or inaccuracy, then the written recall is credited with that recalled idea.

At this point beware of certain problem areas:

1. New ideas, that is ideas not derived directly from an explicitly stated original idea, are not recalled ideas.

This also includes ideas that are statements of ideas implied by the original discussion, ideas that were not explicitly stated even though they are consistent with what was said and even part of what was meant.

2. Vague references to the topics of original ideas without making a definite statement about them are not counted as recalled ideas. For example, if the writer said, "The speaker mentioned the population of Communist China", this would not be counted as a recalled idea.
3. Statements which contradict an idea in the original text or give an opposite meaning are not counted as recalled ideas.
4. In cases where a recalled idea is discernible in two or more parts of the recall text, the most accurate version should be analyzed and the others ignored.

Examples of Recalled Ideas:

ORIGINAL IDEA	RECALLED IDEAS
(U. N. A4) China has a population of about 750 million people.	1. China has a very large population.
	2. China has over 700 million people.
	3. Considering her large population...
	4. Because of the many people in China.
	5. China's population of 570 million...

ORIGINAL IDEA

RECALLED IDEAS

(U. N. A1) The United Nations was originally intended to be a peace-keeping body. The United Nations is a peace-keeping body.

(U. N. A2) Its success has been less than complete (U. N. A3) because not all nations were represented. But how can it do this if not all nations are members?

Recalled Ideas: Model Analyses

The analyses of six recall texts is now presented showing all the recalled ideas which were identified. The recall text itself is shown first followed by the list of recalled ideas it contains together with comments. Reference should be made to the lists of original ideas in Appendix C and to the oral and written texts in Appendices C and D.

WRITTEN RECALL TEXT: HOCKEY W1

1. The speaker feels that the calibre of hockey playing in the National League has deteriorated.
2. There are no longer "superstar" teams such as Montreal, Chicago and Boston.
3. This is mainly because of expansion of the League.
4. Since the League has expanded the "superstar" draft choices have been shared out among the 16 teams and the other players on the teams are just mediocre.
5. Therefore we have quantity instead of quality.
6. The sport is still popular especially among the Americans who, because they have never seen "superstar" hockey, still enjoy it.
7. The speaker however does not enjoy the "diluted" hockey because he is used to watching the "superstar" hockey.
8. The speaker feels that, although most sports are mainly for participation, hockey has now become more of a spectator sport.
9. Hockey games must attract large crowds because in a roundabout way, these crowds pay the players' salaries.
10. The speaker feels that the quality of hockey will get worse.
11. He feels that the National League cannot last.
12. New leagues will have less divisions and fewer teams.
13. The speaker thinks that if such small leagues are formed, only then will the standard of hockey return to or perhaps surpass the old "superstar" level.
14. This aforementioned breaking down of oversized leagues is considered to be inevitable by the speaker.

15. In effect, there are now simply not enough good players to go around.
16. Therefore it is impossible to expect the League as it now is to make available to us good, competitive sport.

Recalled Ideas: Model Analysis

Hockey Wl.

Sentence	Recalled Idea	Comment
1	A1	discernible in spite of paraphrase
2	none	importation of implicit ideas
3	none	importation of implicit idea
4	A9	consistent new idea added
5	none	importation of an inference
6	B6,B7	clearly discernible
7	B3	the recalled idea has added to it an imported inference
8	C1	clearly discernible
9	C3	the recalled idea is given as a reason for a new idea
10	none	importation of an inference
11	E2	the idea is discernible even though the term, "enlarged league" has been changed to the "National League"
12	none	importation of a new idea and an inference
13	none	importation of inconsistent new ideas
14	none	importation of new idea
15	D2	much less precise than the original idea but discernible nevertheless
16	none	inferences

WRITTEN RECALL TEXT: HOCKEY VI

1. The Canadian Hockey League is lowering its standard by adding new teams to the league.
2. The more teams there are the less professional the players become.
3. That is, if more teams are added to the NHL there won't be as good quality when there were only six teams.
4. The speaker feels there should be more quality than quantity.
5. The hockey players' pay is determined by the number of fans that show up at the games.
6. The speaker feels this will change.
7. Not as many people will come to the games because of the added new teams.
8. Therefore, the standard of hockey will go down.
9. By doubling the teams from 16 to 32 for the World Hockey Team, will again lower the quality.
10. Soon the professional league will be broken down into minor leagues and only the best will remain to form the good hockey teams.
11. By adding these new teams hockey won't be as competitive.
12. He feels that the sport will soon slowly fall in popularity and people will begin moving away from it.
13. It will only be re-established when the basic professional teams are put into a higher category at the top.

Recalled Ideas: Model Analysis

Hockey VI

Sentence	Recalled Idea	Comment
1	A1,A5	A1 is distorted by the use of the name "Canadian Hockey League" A5 is much more vague than the original idea
2	none	importation of a new idea
3	none	importation of an inference
4	B9	a clear example of a recalled idea
5	C3	a recalled idea in spite of the inclusion of all hockey players and the omission of "indirectly"
6	none	importation of a new idea
7	C7	the original idea is made much wider in its application
8	none	importation of an inference
9	D3	the original idea is implied by the recall statement
10	E3	discernible in spite of paraphrase
11	none	importation of new ideas
12	none	importation of new ideas
13	none	importation of new ideas

WRITTEN RECALL TEXT: UNITED NATIONS W1

1. In this discussion the speaker states that the expulsion of Taiwan from the United Nations was justified.
2. It was not justified in terms of kicking out a world power, but it allowed the People's Republic of China to join the United Nations in its place.
3. The speaker says that the People's Republic of China should have the right to join the U.N. considering its large population.
4. Compared to the Republic, Taiwan has a small population.
5. He says that you can't leave out an important world power from a peace-minded organization.
6. The speaker also says however that had Taiwan and China come to a peaceful agreement with each other, they could have both been in the U.N.
7. The speaker also said that the People's Republic of China was not allowed in for so long, not because of the United States singly, but because of many nations.
8. They had done this so that there wouldn't be another communist power in the U.N.
9. They were afraid that if there was, it would disrupt the balance of power and China would stop many of the United States' suggestions.
10. The speaker said that the United States didn't support Taiwan and not China with malicious thoughts.
11. He also said that he didn't think that China was malicious towards the United States.

Recalled Ideas: Model Analysis

United Nations WI

Sentence	Recalled Idea	Comment
1	A12	clearly discernible
2	none	importation of new idea and an inference
3	A4,A5	A4 is expressed less precisely A5 is discernible in the first idea
4	A10	Although in a sense an inference, it is regarded as an alternate way of expressing the original idea
5	none	A5 is discernible again, but has already been credited to Sentence 3
6	A8	clearly discernible
7	none	importation of a new idea
8	B12	discernible in spite of paraphrase
9	B13	clearly discernible
10	B10	awkward expression but appearing to be an attempt to state an original idea. New idea added
11	none	importation of a new idea

WRITTEN RECALL TEXT: UNITED NATIONS VI

1. Recently, Communist China was accepted by the majority of world powers as a new member of the United Nations.
2. As a result, Taiwan's membership was dissolved, the reason being that Communist China refused to join hands with its enemy, Taiwan, in matters of world importance.
3. But why was the U. N.'s decision made?
4. To begin with, Communist China has an overwhelming population of 750 million, making it many times larger than that of Nationalist China.
5. It is also evident that China is on its way to becoming one of the great world powers, on the same line as the U. S. and the U. S. S. R.
6. It only seems reasonable that such a great country be given equal status with the rest of the nations.
7. There was however a small number of nations in disagreement with the decision.
8. The United States was one of them.
9. Why did the U. S. try to veto the U. N.'s decision?
10. One possible reason may be the idea that America realizes its present situation, being the greatest Democratic power.
11. Through the years, the U. S. has lashed out strongly against Communism and with the advent of another communistic power being allowed entrance into the U. N., the balance of ideologies may be upset.
12. The U. S. may feel there has been great lean towards Communism in the U. N.

13. But the United States' attempt to repel Communist China failed.
14. It is possible that this was Nationalist China's attempt at suppressing the ideologies of the U. S. by having the majority of powers lean towards their ideas.
15. Is it then possible that China would like the U. S. to forfeit its superiority in favor of a Communistic Nation.
16. It is a difficult thing to answer.

Recalled Ideas: Model Analysis

United Nations VI

Sentence	Recalled Idea	Comment
1	none	importation of an inference
2	A7	less precise but discernible. The information in the first part of the sentence originated with the interviewer.
3	none	rhetical question
4	A4,A10	clearly discernible
5	B8	paraphrase but discernible. New information is added.
6	none	importation of a new idea
7	none	importation of a new idea
8	B2	original idea expressed indirectly as an inference
9	none	rhetical question
10	B6	imprecise but discernible
11	B13	discernible with key word change
12	none	importation of a new idea
13	none	importation of an inference
14	none	importation of inconsistent information
15	none	rhetical question
16	C1	vague in its referent but discernible by its expression

WRITTEN RECALL TEXT: MENTAL ILLNESS W1

1. In general the speaker thinks that although progress is slow, it is strong.
2. He thinks that the facilities used for mental illness are outdated.
3. They were probably made in 1940's, 1950's, 1960's.
4. Smaller institutions tend to be more successful because they concentrate and give more help and treatment to the individual.
5. Larger institutions, on the other hand have more facilities but people on long-range terms (senile people that stay there until they die) are sort of put aside and are given less care.
6. There are too many patients and facilities and not enough psychiatrists.
7. The Health Organization tried to help with this situation but wasn't completely successful.
8. Facilities have greatly improved on the whole but there is still room for more improvement.
9. Not all mental illnesses are severe.
10. With the new drugs produced one can be "cured" (not completely)
11. For example, epilepsy which is one mental illness (or thought to be) can be treated with these drugs.
12. There are many mental illnesses that are curable but without the help of the patient itself this is impossible.
13. The speaker stresses that we need better and more improved facilities.

Recalled Ideas: Model Analysis

Mental Illness W1

Sentence	Recalled Idea	Comment
1	H1,H2	clearly discernible
2	A2	synonym used but discernible
3	A3	clearly discernible
4	B4	paraphrase but discernible
5	F9,F10	Although concealed in imported information, these two original ideas are discernible.
6	A6	a recalled idea adjoined to importations
7	none	perhaps an attempt to express original idea E2, but not discernible as a similar statement
8	none	importation
9	none	importation
10	G2	more inclusive statement but discernible
11	G3,G5	clearly discernible
12	none	importation
13	none	importation

WRITTEN RECALL TEXT: MENTAL ILLNESS V1

1. The facilities that they had for the mentally ill were not very good.
2. The facilities were too old.
3. They were built like prisons in the 1940's to keep the mentally ill from society.
4. The speaker said that these facilities were also understaffed.
5. The buildings were too large and each patient didn't get enough individual attention.
6. He said mentally ill patients were not incurable but it took a longer time to cure some patients than it did others and that some of these patients ran out of time.
7. They died before they were cured.
8. The speaker said that there should be smaller centres and more staff.
9. He said they had a few small centres in Edmonton but that these were for patients who would be there for a short time, like epileptics.
10. These were for patients who were not seriously ill.
11. He said the conditions for treating the mentally ill were improving but improving very slowly.
12. He did not believe in institutionalization.
13. He did not believe that mentally ill people could not be cured in masses.
14. He believed that they need comfortable surroundings and more individual care.

Recalled Ideas: Model Analysis
Mental Illness V1

Sentence	Recalled Idea	Comment
1	none	importation of an inference
2	A2	use of synonym but discernible
3	A3,A4	discernible in spite of omission of information in A3 and a different emphasis in A4
4	A6	more inclusive statement
5	A5	clearly discernible with addition of importation
6	F1,F2,F3	clearly discernible
7	none	repetition of F3 already credited to Sentence 6
8	none	importation of inferences
9	C2	vaguer but discernible
10	none	importation
11	H1,H2	discernible in spite of different emphasis
12	none	importation of an inference
13	none	importation of an inference
14	none	importation of a new idea and an inference

ANALYSIS OF THE RELATIONSHIPS DISPLAYED BY RECALLED IDEAS

The purpose of this analysis is to identify the ways in which recalled ideas are related to other ideas. There are three types of relationships which can be displayed by a recalled idea: it can have an appropriate relationship with another idea; it can have an inappropriate relationship; or it can be presented without being related at all to another idea.

Appropriate Relationship Category

The purpose of this category is to identify those recalled ideas that are expressed in a way which seems to demonstrate that the writer not only understood the idea but was aware of the way the idea was being used in the discussion. In other words he was aware of the role of the idea or of its relationship with other ideas.

Essentially an appropriate relationship is demonstrated if a recalled idea is presented together with either another recalled idea from the same discussion component or with a non-recalled idea that is an appropriate importation derived from the same discussion component. The term "presented together with" means adjacent to and together with logical, sequence or topical links that indicate that the writer intended the two to be related. Apart from this the only way in which an appropriate relationship can exist is if the writer made explicit reference to the role of the idea, for example by stating the question to which the recalled idea was part of the answer.

The following sequence of sentences contains recalled ideas which demonstrate this appropriate relationship:

1. It makes little sense to leave China out of the U.N. when

her population is over 750 million.

2. The U.S. opposed China's admission.
3. The question of whether there was malice against the U.S.
is hard to answer. It is a very hypothetical question.

The two ideas in Sentence One are from the same discussion component and they are linked together showing they are related. They are, therefore, good examples of this category. The idea in Sentence Two is isolated. It is from a discussion component different from the idea preceding it and the one following it. Thus it demonstrates no relationship. The two ideas in Sentence Three are from the same discussion component. Although they are not linked grammatically, as, for example, by cause and effect, they are related because they deal with the same topic and it seems very likely that the writer was attempting to show that they were related. They too are examples of Appropriate Relationship recalled ideas.

Example:

1. Since China's population is so much larger than Taiwan's
and since China is potentially a world power, the choice of
China was justified.
2. The U.N. was set up as a peace-keeping body.
China was not a member.
Because all nations were not members, the U.N. has only
had limited success in its peace-keeping role.

In Sentence One the idea, "since China is potentially a world power," is from a different discussion component and it is clearly playing a different role than in the original. However, although it separates the other two ideas, it does not affect their relationship which is an appropriate one. Therefore these ideas are placed in the Appropriate

Relationship category.

In Example 2 the intervening idea is an appropriate imported idea. Without it the remaining three ideas are related and are all from the same discussion component and they are therefore all placed in the Appropriate Relationship category.

Sometimes two ideas from the same discussion component will be adjacent to each other in the recall text without any apparent links between them, either of logical relationship or sequential order. In this case they are not counted as being related and are not placed in this category.

Example:

1. The U. N. is a peacekeeping body.
2. China has a population of 750 million.
3. The decision to expel Taiwan was justified.

There is no evidence that these three ideas are seen by the writer as being related and they don't follow one from the other in a clear sequence. Therefore they are not counted as being in an appropriate relationship.

Sometimes a recalled idea may not have any other recalled idea adjacent to it, yet it is clear that the writer understood the role of the idea in the discussion. One way he could demonstrate the understanding could be to state the question to which the ideas was an answer.

Example:

When the interviewer asked if malice against the U. S. was intended when the U. N. voted to admit China, the speaker replied that this was a difficult question to answer.

In this case the recalled idea would be placed in the Appropriate

Relationship Category even though it is not adjacent to another recalled idea. If this explicit indication of the role of an idea is inappropriate, for example if the wrong question precedes the idea then it would not be placed in this category but in the Inappropriate Relationship Category. An appropriate relationship could also be shown by the recalled idea being presented following a sequence of non-recalled ideas which were nevertheless appropriate points in the sequence to which the recalled idea belonged. In this case the recalled idea is assumed to be appropriately located and placed in this category.

Note that if a recalled idea displays two relationships, one appropriate and the other not, it is still categorized as having an appropriate relationship.

Absence of Relationship Category

This is a straightforward class of those recalled ideas that demonstrate no relationship to any other idea or which are not accompanied by explicit indications of their discussion role.

Inappropriate Relationship Category

This category consists of those recalled ideas which do not manifest an appropriate relationship nor an absence of relationship.

This is indicated by:

1. Being attached to a sequence of recalled ideas or non-recalled ideas from a different discussion component.
2. Being attached to a single recalled idea from another discussion sequence. Where this is the only relationship demonstrated by each recalled idea they would both be placed in this category.

3. Being attached to an inappropriate non-recalled idea.
4. Inappropriate explicit reference being made to the role of the idea by the writer, e.g. introducing the idea by referring to the wrong question for that discussion component.

If a recalled idea is presented as part of a sequence of ideas from a different discussion component together with evidence that it is related to that sequence, it would be placed in this category.

Example:

China has a large population and is potentially a world power. Therefore it is justified that she should have been chosen by the U. N.

The statement that China is potentially a world power is associated and linked with two ideas from a different discussion component. It would therefore be placed in this category. The other two ideas are correctly related.

If an idea from one discussion component is linked with an idea from another, both are said to be inappropriately related and placed in this category.

Example:

The U. S. originally opposed China's admission because China refused to join the U. N. while Taiwan was a member. However, this is only the case if neither idea is otherwise appropriately related.

If a recalled idea is attached to an idea that is not a recalled idea and which is not an appropriate importation from the same discussion component, it is placed in this category. To be called appropriate the importation should be an inference from information given in the same

discussion component. If it seems to arise from information outside that discussion component or from information outside the discussion altogether, it is inappropriate. The following are examples of this kind of inappropriate relationship.

ORIGINAL IDEA	RECALLED IDEA AND CONTEXT
(U. N. A2) The U. N. has had less than complete success.	Although the U. N. was originally to benefit everyone, <u>it did not turn out that way.</u>
(U. N. B2) The U. S. opposed China's admission at first.	<u>The reason the U. S. was against Communist China</u> was because the U. S. are deathly afraid of communism.

If the writer indicates an inappropriate role for the recalled idea in question by presenting it as the answer for a question other than the one preceding that discussion component, the recalled idea is placed in this category.

Example:

When the interviewer asked if the U. N. voted China in because of the U. S. policy, the speaker said that China had a very large population.

Finally, if a recalled idea is clearly playing a different role in the written recall than in the original, yet is not disqualified from membership in the Appropriate Relationship category by any criteria stated so far, it should be labelled as Inappropriate Relationship. For example if an idea from the original is wrongly expressed as a conclusion, it would illustrate this type of inappropriate relationship.

ORIGINAL IDEA

RECALLED IDEA

(U.N. B2) The U.S. opposed China's admission.

Therefore the U.S. was right in opposing the Chinese attempt to gain admission to the U.N.

MODEL ANALYSIS OF THE RELATIONSHIPS DISPLAYED BY RECALLED IDEAS

The following is a model analysis of the relationships displayed by the recalled ideas in recall texts W1 and V1 from all three discussion passages. Refer to Appendices C, D and F for the texts and lists of ideas and to the model analysis of recalled ideas in this appendix for the six recall texts.

Relationships Displayed by Recalled Ideas: Model Analysis

Hockey W1

Recalled Idea	Sentence	Relationship	Comment
A1	1	appropriate	topically related to idea in Sentence 2, an imported inference derived from same discussion component
A9	4	appropriate	topically related to inference in Sentence 3
B3	7	appropriate	topically related to appropriate imported inference
B6	6	appropriate	logically related to B7
B7	6	appropriate	logically related to B6
C3	8	inappropriate	logically related to imported new idea
D2	15	appropriate	logically related to imported inference in Sentence 16.
E2	11	absence of relationship	not related to adjoining ideas

Relationships Displayed by Recalled Ideas: Model Analysis

Hockey V1 :

Recalled Idea	Sentence	Relationship	Comment
A1	1	appropriate	both recalled ideas
A5	1	appropriate	are interrelated
B9	4	absence of relationship	unrelated to either adjacent idea
C3	5	appropriate	logically related to imported idea in Sentence 6
C7	7	appropriate	logically related to imported inference from same discussion component
D3	9	inappropriate	related to an imported inference derived from a different discussion component
E3	10	inappropriate	topically related to new idea

Relationships Displayed by Recalled Ideas: Model Analysis

United Nations W1

Recalled Idea	Sentence	Relationship	Comment
A4	3	appropriate	related to A5
A5	3	appropriate	related to A4
A8	6	appropriate	topically related to repeated recalled idea in Sentence 5
A10	4	appropriate	related to A4
A12	1	appropriate	related to general sequence of recalled ideas in Sentences 1-6
B10	10	inappropriate	topically related to imported new idea in Sentence 11
B12	8	appropriate	related to B13
B13	9	appropriate	related to B12

Relationships Displayed by Recalled Ideas: Model Analysis

United Nations VI

Recalled Idea	Sentence	Relationship	Comment
A4	4	appropriate	related to A10, a recalled idea from the same discussion component
A7	2	appropriate	logically related to an imported inference derived from the same discussion component
A10	4	appropriate	related to A4
B2	8	appropriate	related, in spite of intervening Sentence 9, to recalled idea in Sentence 10 from same discussion component
B6	10	appropriate	related to B2
B8	5	inappropriate	related to A10 and to imported new idea
B13	11	appropriate	related to imported inference in same sentence
C1	16	inappropriate	related to imported new idea in Sentence 15

Relationships Displayed by Recalled Ideas: Model Analysis

Mental Illness W1

Recalled Idea	Sentence	Relationship	Comment
A2	2	appropriate	related to A3
A3	3	appropriate	related to A2
A6	6	inappropriate	related to imported new idea
B4	4	inappropriate	related to imported new idea in same sentence
F9	5	appropriate	related to F10
F10	5	appropriate	related to F9
G2	10	appropriate	G2, G3, and G5 are related
G3	11	appropriate	to each other in an
G5	11		appropriate sequence
H1	1	appropriate	related to H2
H2	1	appropriate	related to H1

Relationships Displayed by Recalled Ideas: Model Analysis

Mental Illness VI

Recalled Idea	Sentence	Relationship	Comment
A2	2	appropriate	related to A3
A3	3	appropriate	related to A2
A4	3	appropriate	related to A3
A5	5	appropriate	related to A6
A6	4	appropriate	related to A5
C2	9	inappropriate	related to imported new idea in the same sentence
F1	6	appropriate	F1, F2 and F3 are appropriately interrelated
F2	6	appropriate	
F3	6	appropriate	
H1	11	appropriate	related to H2
H2	11	appropriate	related to H1

DISTORTED RECALLED IDEAS

Another way in which recalled ideas can be described is in terms of their meaning relationship to the original ideas from which they were derived. Thus, a second analysis sets out to classify recalled ideas along this dimension.

The first task of this analysis is to identify those recalled ideas whose meaning is distorted, or significantly different from that of the original idea. Then the second task is to classify the distorted recalled ideas into categories of types of distortion.

A distorted idea is present in the written recall if an original idea on the answer sheet is discernible in a form that makes its recalled meaning significantly different from the original meaning. By "significantly different meaning" is meant where the essential meaning of the original is not preserved in the recall. That is to say that exact equivalence is not insisted upon since most recalled ideas are in the form of paraphrase. If the written recall seems to have changed the original meaning significantly, count the idea as a distortion. Significantly changed means that if the peripheral details of the idea are changed it does not count as a distortion. Changes that apply to the main part of the idea are considered significant. The overall phenomenon is partly defined by the character of its four categories.

Category One: Significant change of meaning through the use of different key words.

Sometimes an idea will be very similar to the original except that a key word in the expression has been changed thereby altering the meaning.

Examples:

ORIGINAL IDEA

RECALLED IDEA

(U. N. A1) The U. N. was originally intended to be a peacekeeping body.

1. The U. N. is a peacekeeping core.
2. The U. N. is a peacekeeping nation.

(U. N. C3) Perhaps in some cases nations were being malicious.

1. Some nations maybe did vote for revenge against the U. S.

Category Two: Significant change of meaning through changes in the domain of application of the idea.

Often ideas apply to particular entities or members of classes of entities. For example "Boys are rough" tells us that all members of the class of entities, "boys" are rough. However, the sentence, "Big boys are rough", tells us that only part of the class is rough, namely those boys who are big. This is what is meant by the "domain of application". Sometimes an idea in the written recall will have a wider or narrower domain of application than the original. This category takes precedence over Category One in the event that a keyword change results in a change of domain of application. This category of distortion can often be recognized by:

1. The addition, omission, or substitution of modifying words or phrases that limit the application of the idea. For example, adjectives of adjective clauses or phrases that are restrictive.
2. The use of more general words instead of ones having a more restricted reference and vice-versa. For example, the use of "doctors" instead of "psychiatrists" and "nurses" instead

of "staff"

Examples:

ORIGINAL IDEA

RECALLED IDEA

(M. I. A6) There are not enough psychiatrists for the number of patients.

The institutes are understaffed.

(H. A1) The standard of hockey in the national league is going down.

He felt that there was a breakdown in the game of ice hockey.

(H. C7) The fans of the old clubs will decrease

Hockey fans will stop coming to see the games.

Category Three: Significant changes in meaning through changes in the level of precision.

The expression of recalled ideas can vary in their precision or exactness, in their definiteness and completeness, and in their accuracy. A recalled idea that demonstrates one of these kinds of distortion is allocated to Category Three. This category can be signalled by:

1. The use of indefinite terms to express definite quantities or numbers, or vice versa.
2. The omission of part of the main idea of a statement.
3. Inaccuracies in the use of quantities or numbers.
4. The use of vaguer terms than in the original idea or vice versa.

Examples:

ORIGINAL IDEA

(H. D2) There are not enough top-quality players to go around for 16 teams.

(H. E4) Eventually the six old clubs will be reinstated.

(U. N. A7) Communist China did not want to join the U. N. as long as Taiwan was a member.

(U. N. A4) Communist China has a population of about 750 million people.

(M. I. B7) In small institutions you can rehabilitate the mentally ill a lot faster and a lot better.

(M. I. B1) The Blair Report brought out by the last Social Credit government helped people to recognize the problem.

RECALLED IDEA

There are not enough good players to fill the positions.

He stated something about hockey in the future reinstating itself back to fewer teams.

Communist China refused to have anything to do with Taiwan.

1. ...because of its large population.

2. China has a population of 570 million.

(In small institutions) treatment is often not as long.

The government was let known about conditions.

Category Four: Residual Distortions

Some recalled ideals are obviously distorted yet do not fit any of the three subcategories defined above and have no common characteristics that allow them to be labelled more precisely. Any recalled ideas which

seem to be expressing an essentially different meaning than the original idea from which they are derived and which do not clearly belong to one of the defined categories should be placed in this residual category. The following are examples of this subcategory:

ORIGINAL IDEA	RECALLED IDEA
(U.N. A7) China refused to join the U.N. as long as Taiwan was a member.	China doesn't want to join the U.N. if Taiwan was going to join.
(M.I. G3) For example, epileptics used to be considered as being mentally ill.	...because of patients who were not mentally but physically ill (e.g. epileptics)...

MODEL ANALYSIS OF DISTORTED RECALLED IDEAS

The following is an analysis of the six sample recall texts showing the recalled ideas that were classified as distortions and the categories of distortion into which they were placed. The texts are the same as the ones used in the first model analysis in this Appendix and reference should be made to them.

Distorted Recalled Ideas: Model Analyses

Hockey W1

Distorted Recalled Idea	Distortion Category	Comment
B3	3	The idea has lost some of the precision of the original. The original idea stated that his present enjoyment was less than it used to be, and did not say that he did not derive any enjoyment now.

Hockey VI

A1	1	name of league changed by substitution of key word "Canadian" for "national".
A5	3	loss of precision.
C3	2	application of idea is extended to all hockey players, not just the ones in the National League.
C7	2	application of the idea is extended to all fans, not just those of the six original clubs
D3	1	substitution of key word "Team" for "League".

Distorted Recalled	Distortion Category	Comment
Idea		
United Nations W1		
A4	3	indefinite expression replacing precise one.
B10	3	vague expression of the idea
United Nations V1		
A7	3	vague, more general statement
B14	1	key word "power" replaced by "ideologies"
C1	3	vague referent
Mental Illness W1		
G2	3	less precise than original as to whom the new drugs benefit
Mental Illness V1		
A2	1	"too old" is not a synonym for "archaic"
A3	3	omission of part of the central idea
A4	4	the idea does not seem to preserve the original intention
A6	2	application of idea to class of staff generally rather

Distorted Recalled	Distortion Category	Comment
Idea		
		than of psychiatrists
C2	3	loss of precision
H1	3	loss of precision in referent

IMPORTED IDEAS

The analyses that involved recalled ideas, their relationships and distortions, worked from the original ideas to their expression in the written recall texts. It was, therefore, unnecessary to identify ideational units in the written recalls. However, consideration of imported information and attempts to quantify it necessitate the definition and identification of such units in the recall texts. Consequently before the analysis of imported ideas can proceed it is necessary to segment the written recall texts into idea units. The unit chosen and defined has been called a "response unit".

The Response Unit

A response unit is the smallest number of words that constitutes a complete thought. Essentially it is an assertion, or a statement of fact or opinion. It asserts that something is so. It may be stated fully as a complete proposition as in the example:

Facilities for the treatment of mental illness are inadequate./
Alternatively, it may be linguistically abbreviated in the sense that it is contained as part of another assertion. For example the following sentence consists of two responses:

Mental hospitals are archaic/and too large./

In full the two assertions making up the two response units would be:

Mental hospitals are archaic.

Mental hospitals are too large.

The problem lies mainly with units that are linguistically abbreviated.

Generally two elements that are coordinated are coded as two

response units if they constitute two assertions.

Examples:

<u>Nouns</u>	The doctors/and nursing staff/are inadequate./
<u>Adjectives</u>	The hospitals are archaic/and too large./
<u>Adverbs</u>	Progress is being made slowly/but surely./
<u>Verbs</u>	Players don't skate/and pass/like they used to./

N. B. A response unit is identified by a "/" at its end. When a response unit is interrupted by another unit, the interruption is marked by a "/" which indicates that the response unit at that point is incomplete.

As a general rule, to be counted as a separate response unit, a group of words should be seen serving the purpose of adding an assertion, not limiting the application of another assertion. For example the phrases underlined in the following sentences are not separate units because they serve to limit another assertion.

There are not enough mental hospitals in Edmonton./

The man who lives next door is sick./

Large mental hospitals don't really help sick people to overcome their problem./

When you are a short term patient, the institution may help you./

If you are senile, they can do nothing for you/

In other words, these underlined phrases serve to restrict the scope of the assertion in which they are embedded. They do not add assertions. Therefore they are not separate response units.

The following sentences illustrate phrases that do add assertions and that do, therefore, constitute response units:

He said the hospitals were outdated,/being built in the 1960's,
1950's,/ and 1940's./ (4 units)

They thought epilepsy was a mental illness/because they took these
fits./ (2 units)

Progress is slow,/although it is sure/ (2 units)

The principle of additivity allows adverbial clauses and phrases
of reason, manner, purpose, degree, concession, and result to be included
as separate response units.

However, clauses and phrases of condition, time and place usually
serve to restrict the scope of the main clause, and so they do not
constitute separate units.

By the same principle non-restrictive adjective clauses
constitute separate response units since their function is to add
information.

Example:

The standard of hockey is declining/which is a bad thing./
(2 units)

However, restrictive adjective clauses, whose purpose is to limit the
application of the main clause, are not separate response units.

Example:

Patients who are in hospital for a long period of time often
develop a form of institutionalization./ (1 unit)

Cases of doubt due to punctuation inaccuracy etc. should be coded as
non-restrictive.

The same principle should be used to consider elements like
prepositional phrases and participial phrases.

Examples:

They were built like prisons/in the 1940's./ (2 units)

BUT: There are not enough psychiatrists per patient in the big
institutions./ (1 unit)

BUT: There are not enough hospitals, relating to Edmonton.
(1 unit)

With the new drugs nowadays,/this can be cured./ (2 units)

BUT: There are too many hospitals with inadequate facilities./
(1 unit)

Special problems:

1. Coordinated subjects + coordinated predicates.

Example:

He says progress made in mental hospitals/and research/is
slow/but strong./ (4 units)

In this sentence each predicate adjective applies to each
coordinated object of the preposition so that there would be
four units here.

2. Etc. "Etc." is counted as a separate response.

Example:

He said the skating/etc./was better./ (2 units)

Sometimes other expressions are used which are rather like
etc. in function, such as "or whatever", and "and such like".

These are also counted as separate response units.

3. Examples given to illustrate an assertion count as separate responses.

Example:

The old teams/like Montreal/and Boston/will start to lose

their fans. /

(3 units)

4. Expressions like "in conclusion", "to start with", and, which refer to the discussion context itself, are not counted as separate units unless they constitute full assertions as in, "He opened the discussion/by stating that..."

5. Parenthetical statements

Sometimes additive assertions are placed within parentheses. These may be to give examples of a previous assertion.

Example:

but some people on long range terms/(senile people that stay there until they die)/are sort of put aside./ (2 units)

Here the intention is clearly to add information. The parenthetical statement does not modify or limit the meaning of the previous assertion. Therefore it is counted as a separate response unit.

However, parentheses may be used to enclose statements which do limit or modify.

Examples:

For example epilepsy/which is one form of mental illness (or thought to be)/can be treated with these drugs./ (2 units)

With the new drugs produced/one can be cured (not completely)./

(2 units)

Here the intention seems to be to correct a wrong emphasis in the preceding assertion. Thus, the parenthetical statement serves a limiting rather than an additive function and hence is not counted as a separate response unit.

6. When it is difficult to decide whether a phrase or group of words is restrictive or non-restrictive.

In cases where it is not clear whether the group of words in question is restrictive or non-restrictive in function, assume that it is non-restrictive and count it as a separate response unit.

Examples:

A report/presented by the Social Credit government/outlined the problems./ (2 units)

Where patients can be treated properly/by a capable staff/ (2 units)

7. When two restrictive clauses or phrases are either following or preceding a main clause assertion, count the total clause group (sentence) as two response units.

Example:

Also the patient does not benefit from this unless he is a short term patient/and does not need complete attention/ (2 units)

The assumption is that two assertions are contained here, namely:

- (1) Also the patient does not benefit from this unless he is a short term patient.
 - (2) Also the patient does not benefit from this unless he does not need complete attention.
8. Descriptive references to the interview situation.
- Unless the group of words in question is a complete assertion in itself, do not count it as a separate response.

Examples:

As a wrap up he goes on saying even though the problem is going at a slow rate/-it is a strong rate./ (2 units)

When the interviewer asked him what his views were he replied that he felt they were inadequate./ (1 unit)

Here is a sample sentence divided into response units:

He concludes that/thanks to modern medicine/and humanitarians/
(those who seek the best for the unnoticed sick)/conditions
in institutions/and mental illness cures/are improved./
(5 units)

Segmentation of texts into response units is demonstrated by the W1 and V1 recall texts for the three discussion passages in the model analyses of imported response units at the end of this appendix.

Imported Response Units

Almost all the recall texts contain response units that are ideas or part of ideas not explicitly stated in the original discussions. These are called imported response units. Descriptive or evaluative comments are not importations even though they are not part of the original discussion, so response units that constitute these are not included in this analysis. This analysis applied only to those response units that seem to represent the writer's belief that he was expressing an original idea.

As in the analysis of the distorted recalled ideas, the first step is to identify the imported response units and the second to allocate these to categories, in this case three.

Category One: Logical Inferences, Assumptions and Conclusions

An imported response unit is placed in this category if it is consistent with the information in the original discussion text in the sense that it is a valid inference, conclusion or summary based upon the explicit information in the discussion text. That is provided it follows logically from the information in the original text without being dependent upon information from any other source. Perhaps one way to characterize this kind of imported idea would be to say that the writer himself or interviewer would undoubtedly have agreed with the idea.

Examples:

1. The U.N. would be able to function better if China was a member.
2. Thus Taiwan had to be disposed of to admit China.
3. China was voted in by the U.N.
4. Some nations voted for China's admission.
5. The admission of China was a threat to the U.S.

Category Two: New Consistent Information

An imported response is placed in this category if it seems to be derived from information not contained in the original discussion, yet which is however not inconsistent with the ideas in the text. These are not points made by the speaker or interviewer nor necessarily implied, but which he might have agreed with. While there is no evidence that he would have, neither is there any that he would not have.

Examples:

1. China is a more powerful nation than Taiwan.

2. Many small nations disliked the U.S.
3. The U.N. was designed to benefit the whole world.
4. Another communist power in the U.N. would stop the U.S. proposals.

Category Three: New Inconsistent Information

These are imported responses that are explicitly or implicitly inconsistent with the ideas in the original text. They may be invalid inferences, conclusions or summaries, or they may be new information which conflicts with information in the original text. The category also includes assertions that questions were asked which were not part of the discussion. There is evidence that the speaker would not have agreed with the meaning of these responses.

Examples:

1. He said there was no malice intended.
2. The U.S. and China came to an agreement.
3. Only for a brief time did the U.N. perform its function.
4. In order to decide who should be in the U.N. you have to take into consideration the social conditions in the country.

Model Analysis of Imported Response Units

A model analysis of six recall texts follows. Each text is segmented into response units and the ones underlined are importations. The number at the beginning of each imported response unit is the number of the category into which it was placed.

WRITTEN RECALL TEXT: HOCKEY W1

1. The speaker feels that the calibre of hockey playing in the National League has deteriorated./
2. (1) There are no longer "superstar" teams/ (1) such as Montreal,/
(1) Chicago/ (1) and Boston./
3. (1) This is mainly because of expansion of the League./
4. Since the League has expanded the "superstar" draft choices have been shared out among the 16 teams/ (2) and the other players on the teams are just mediocre./
5. (1) Therefore we have quantity instead of quality./
6. The sport is still popular/especially among the Americans/ who,/because they have never seen "superstar" hockey,/still enjoy it./
7. The speaker however does not enjoy the "diluted" hockey/
(1) because he is used to watching the "superstar" hockey./
8. The speaker feels that,/although most sports are mainly for participation,/ (2) hockey has now become more of a spectator sport./
9. (2) Hockey games must attract large crowds/because in a roundabout way, these crowds pay the players' salaries./
10. (1) The speaker feels that the quality of hockey will get worse./
11. He feels that the National League cannot last./
12. (3) New leagues will have less divisions/ (1) and fewer teams./
13. (3) The speaker thinks that if such small leagues are formed, only then will the standard of hockey return to/(3) or perhaps surpass/ the old "superstar" level./

14. (2) This aforementioned breaking down of oversized leagues is considered to be inevitable by the speaker./
15. In effect, there are now simply not enough good players to go around./
16. (1) Therefore it is impossible to expect the League as it now is to make available to us good,/(1) competitive/sport./

WRITTEN RECALL TEXT: HOCKEY VI

1. The Canadian Hockey League is lowering its standard/by adding new teams to the league./
2. (2) The more teams there are the less professional the players become./
3. (1) That is, if more teams are added to the NHL there won't be as good quality when there were only six teams./
4. The speaker feels there should be more quality than quantity./
5. The hockey players' pay is determined by the number of fans that show up at the games./
6. (2) The speaker feels this will change./
7. (1) Not as many people will come to the games. (1) because of the added new teams./
8. (1) Therefore, the standard of hockey will go down./
9. By doubling the teams from 16 to 32 for the World Hockey Team, (1) will again lower the quality./
10. (2) Soon the professional league will be broken down into minor leagues/ (2) and only the best will remain to form the good hockey teams./
11. (2) By adding these new teams/ (2) hockey won't be as competitive./
12. (2) He feels that the sport will soon slowly fall in popularity/ (2) and people will begin moving away from it./
13. (2) It will only be re-established when the basic professional teams are put into a higher category at the top./

WRITTEN RECALL TEXT: UNITED NATIONS W1

1. In this discussion the speaker states that the expulsion of Taiwan from the United Nations was justified./
2. (2) It was not justified in terms of kicking out a world power,/
(1) but it allowed the People's Republic of China to join the United Nations in its place./
3. The speaker says that the People's Republic of China should have the right to join the U.N./considering its large population./
4. Compared to the Republic, Taiwan has a small population./
5. He says that you can't leave out an important world power from a peace-minded organization./
6. The speaker also says however that had Taiwan and China come to a peaceful agreement with each other, they could have both been in the U.N./
7. (2) The speaker also said that the People's Republic of China was not allowed in for so long,/
(2) not because of the United States singly,/
(2) but because of many nations./
8. They had done this/so that there wouldn't be another communist power in the U.N./
9. They were afraid that if there was, it would disrupt the balance of power/
(2) and China would stop many of the United States' suggestions./
10. The speaker said that the United States didn't support Taiwan/ and not China/with malicious thoughts./
11. (2) He also said that he didn't think that China was malicious towards the United States either./

WRITTEN RECALL TEXT: UNITED NATIONS VI

1. (1) Recently, Communist China was accepted by the majority of world powers as a new member of the United Nations./
2. As a result, Taiwan's membership was dissolved./ the reason being that Communist China refused to join hands with its enemy, Taiwan, in matters of world importance./
3. But why was the U.N.'s decision made?/
4. To begin with, Communist China has an over-whelming population of 750 million,/ making it many times larger than that of Nationalist China./
5. It is also evident that China is on its way to becoming one of the great world powers,/(2) on the same line as the U.S./ (2) and the U.S.S.R./
6. (2) It only seems reasonable that such a great country be given equal status with the rest of the nations./
7. (2) There was however a small number of nations in disagreement with the decision./
8. The United States was one of them./
9. Why did the U.S. try to veto the U.N.'s decision?/
10. One possible reason may be the idea that America realizes its present situation, being the greatest Democratic power./
11. (2) Through the years, the U.S. has lashed out strongly against Communism,/(1) and with the advent of another communistic power being allowed entrance into the U.N.,/the balance of ideologies may be upset./

12. (2) The U.S. may feel there has been great lean towards Communism in the U.N./
13. (1) But the United States' attempt to repel Communist China failed./
14. (3) It is possible that this was Nationalist China's attempt at suppressing the ideologies of the U.S./ (3) by having the majority of powers lean towards their ideas./
15. (2) Is it then possible that China would like the U.S. to forfeit its superiority in favor of a Communistic Nation?/
16. It is a difficult thing to answer./

WRITTEN RECALL TEXT: MENTAL ILLNESS W1

1. In general the speaker thinks that/although progress is slow,/ it is strong./
2. He thinks that the facilities used for mental illness are outdated./
3. They were probably made in 1940's,/1950's,/1960's./
4. Smaller institutions tend to be more successful/ (2) because they concentrate/ (1) and give more help/ (1) and treatment/to the individual./
5. (2) Larger institutions, on the other hand have more facilities/ but people on long-range terms/ (senile people that stay there until they die)/are sort of put aside/ (1) and are given less care./
6. (2) There are too many patients/ (3) and facilities/and not enough psychiatrists./
7. (1) The Health Organization tried to help with this situation/ (2) but wasn't completely successful./
8. (3) Facilities have greatly improved on the whole/ (1) but there is still room for more improvement./
9. (2) Not all mental illnesses are severe./
10. With the new drugs produced/one can be "cured" (not completely)/
11. For example epilepsy/which is one mental illness (or thought to be)/can be treated with these drugs./
12. (2) There are many mental illnesses that are curable/ (2) but without the help of the patient itself this is impossible./

13. (1) The speaker stresses that we need better / (1) and more improved /
facilities. /

WRITTEN RECALL TEXT: MENTAL ILLNESS VI

1. (1) The facilities that they had for the mentally ill were not very good./
2. The facilities were too old./
3. They were built like prisons/in the 1940's/ (2) to keep the mentally ill from society./
4. The speaker said that these facilities were also understaffed./
5. The buildings were too large/ (2) and each patient didn't get enough individual attention./
6. He said mentally ill patients were not incurable/but it took a longer time to cure some patients than it did others/and that some of these patients ran out of time./
7. They died before they were cured./
8. (1) The speaker said that there should be smaller centres/ (1) and more staff./
9. He said they had a few small centres in Edmonton,/ (2) but that these were for patients who would be there for a short time/ (3) like epileptics./
10. (2) These were for patients who were not seriously ill./
11. He said the conditions for treating the mentally ill were improving/but improving very slowly./
12. (1) He did not believe in institutionalization./
13. (1) He did not believe that mentally ill people could be cured in masses./
14. (2) He believed that they need comfortable surroundings/ (1) and more individual care./

APPENDIX H

TWO-WAY ANALYSIS OF VARIANCE TABLES,
TREATMENT X READING LEVELS

TABLE H-1

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X READING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF WORDS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1316	1316	.39	.537
Reading Levels	2	31527	15763.5	4.56	.016
Interaction	2	466	233	.07	.934
Error	36	122171	3393.6		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	2763	2763	.68	.414
Reading Levels	2	72642	36321	8.95	.000
Interaction	2	3118	1559	.38	.684
Error	42	170539	4060.5		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	20918	20918	5.48	.024
Reading Levels	2	2838	1419	.37	.692
Interaction	2	1033	516.5	.14	.874
Error	42	160279	3816.2		

TABLE H-2

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X READING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF RESPONSE UNITS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	24.4	24.4	.51	.481
Reading Levels	2	401.7	200.9	4.18	.023
Interaction	2	21.3	10.7	.22	.802
Error	36	1730.9	48.1		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	14.09	14.09	.37	.545
Reading Levels	2	431.2	215.6	5.71	.006
Interaction	2	1.16	.58	.02	.985
Error	42	1585.5	37.8		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	481.3	481.3	9.34	.004
Reading Levels	2	86.5	43.3	.84	.439
Interaction	2	205.0	102.5	1.99	.149
Error	42	2165.0	51.5		

TABLE H-3

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X READING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF RECALLED IDEAS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	69.43	69.43	4.89	.033
Reading Levels	2	103.0	51.52	3.63	.037
Interaction	2	22.29	11.14	.78	.464
Error	36	511.14	14.20		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	24.08	24.08	3.66	.062
Reading Levels	2	41.29	20.65	3.14	.054
Interaction	2	72.92	3.65	.55	.578
Error	42	276.0	6.57		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	72.52	72.52	9.25	.004
Reading Levels	2	49.29	24.65	3.15	.053
Interaction	2	12.54	6.27	.80	.456
Error	42	329.12	7.84		

TABLE H-4

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X READING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF RECALLED IDEAS
PRESENTED IN AN APPROPRIATE RELATIONSHIP

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	48.22	48.22	3.07	.088
Reading Levels	2	94.05	47.02	2.99	.063
Interaction	2	25.0	12.50	.80	.459
Error	36	565.71	15.71		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	40.33	40.33	5.34	.026
Reading Levels	2	33.04	16.52	2.19	.125
Interaction	2	21.79	10.90	1.44	.248
Error	42	317.5	7.56		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	88.02	88.02	10.24	.003
Reading Levels	2	23.29	11.65	1.36	.269
Interaction	2	31.79	15.90	1.85	.170
Error	42	360.9	8.59		

TABLE H-5

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X READING LEVELS
ON THE DEPENDENT VARIABLE, NUMBER OF NON-DISTORTED RECALLED IDEAS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	74.67	74.67	7.99	.007
Reading Levels	2	69.91	34.45	3.69	.035
Interaction	2	16.62	8.31	.89	.510
Error	36	336.29	9.34		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	35.02	35.02	6.70	.013
Reading Levels	2	34.67	17.33	3.31	.046
Interaction	2	11.17	5.58	1.07	.353
Error	42	219.62	5.23		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	24.08	24.08	4.35	.043
Reading Levels	2	19.50	9.75	1.76	.184
Interaction	2	3.17	1.58	.29	.753
Error	42	232.50	5.54		

TABLE H-6

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X
 READING LEVELS ON THE DEPENDENT VARIABLE, PERCENTAGE
 OF RECALLED IDEAS PRESENTED IN ISOLATION

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	817.5	817.5	1.64	.209
Reading Levels	2	1869.3	934.7	1.87	.169
Interaction	2	1702	851	1.70	.196
Error	36	17988.6	499.7		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	71.47	71.47	.14	.708
Reading Levels	2	3381	1690.5	3.35	.045
Interaction	2	413.5	206.8	.41	.666
Error	42	21178.4	504.2		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1342.8	1342.8	2.85	.099
Reading Levels	2	865.8	432.9	.92	.406
Interaction	2	416.3	208.2	.44	.645
Error	42	19765.7	470.6		

TABLE H-7

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X READING
LEVELS ON THE DEPENDENT VARIABLE, PERCENTAGE OF RECALLED
IDEAS PRESENTED IN AN INAPPROPRIATE RELATIONSHIP

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	247	247	1.05	.312
Reading Levels	2	199.5	99.8	.43	.657
Interaction	2	1413	706.5	3.01	.062
Error	36	8447.4	234.7		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1965.9	1965.9	3.51	.068
Reading Levels	2	160.2	80.1	.14	.867
Interaction	2	733.6	366.8	.655	.525
Error	42	23529.3	560.2		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	478	478	.92	.341
Reading Levels	2	454.9	227.5	.44	.647
Interaction	2	1131.8	565.9	1.09	.344
Error	42	21735.7	517.5		

TABLE H-8

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X
READING LEVELS ON THE DEPENDENT VARIABLE, PERCENTAGE
OF RESPONSE UNITS THAT WERE IMPORTATIONS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1540.2	1540.2	4.89	.033
Reading Levels	2	1458.3	729.2	2.32	.113
Interaction	2	386.1	193	.61	.547
Error	36	11337.9	314.9		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1621	1621	5.49	.024
Reading Levels	2	515.1	257.6	.87	.425
Interaction	2	357.9	179	.61	.550
Error	42	12402.9	295.3		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	170.8	170.8	.64	.427
Reading Levels	2	144.5	72.3	.27	.763
Interaction	2	1086.9	543.4	2.05	.142
Error	42	11159.2	256.7		

APPENDIX I

**MEANS AND VARIANCE TABLES FOR THE TWO-WAY ANALYSIS
OF VARIANCE, TREATMENT X LISTENING LEVELS**

TABLE I-1

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE ONE, NUMBER OF WORDS, FOR THE TREATMENT X LISTENING LEVELS ANALYSIS OF VARIANCE

School A

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	213.9	6839.8	148.4	2225.6	159.4	4291.6	173.9
Reading	248.7	4156.9	143.1	1024.5	166.1	2591.2	186.0
Level Mean	231.3		145.8		162.8		

School B

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	253.0	7356.3	154.1	3056.1	167.4	3881.4	191.5
Reading	226.8	1210.5	148.5	3832.6	153.8	4891.4	176.3
Level Mean	239.9		151.3		160.6		

School C

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	172.8	2080.5	157.5	2521.7	168.5	6379.7	166.3
Reading	217.8	2965.6	229.5	2763.1	180.4	4060.8	209.2
Level Mean	195.3		193.5		174.4		

TABLE I-2

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
TWO, NUMBER OF RESPONSE UNITS, FOR THE TREATMENT
X LISTENING LEVELS ANALYSIS OF VARIANCE

School A

Levels							
High			Middle		Low		Treatment Mean
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	24.7	90.6	18.6	41.3	18.7	45.9	20.7
Reading	28.4	39.0	16.6	7.0	12.9	54.1	23.3
Level Mean	26.6		17.6		20.3		

School B

Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	22.5	36.0	14.6	30.3	13.9	33.8	17.0
Reading	18.3	14.8	14.3	33.1	15.3	78.2	15.9
Level Mean	20.4		14.4		14.6		

School C

Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	18.3	19.6	16.5	33.1	17.4	84.8	17.4
Reading	22.8	51.6	26.0	50.3	22.4	100.6	23.7
Level Mean	20.5		21.3		19.9		

TABLE I-3

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
THREE, NUMBER OF RECALLED IDEAS FOR THE TREATMENT X
LISTENING LEVELS ANALYSIS OF VARIANCE

School A

School A							
Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	9.9	41.1	5.9	8.4	8.1	7.1	8.0
Reading	12.7	4.9	8.1	7.8	10.0	17.0	10.3
Level Mean	11.3		7.0		9.1		

School B

School B							
Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	5.8	3.4	4.1	4.4	4.0	6.0	4.6
Reading	7.4	9.7	6.1	11.8	4.6	4.6	6.0
Level Mean	6.6		5.1		4.3		

School C

School C							
Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	6.6	5.4	6.3	7.1	5.6	8.8	6.2
Reading	10.3	5.6	7.5	7.4	8.1	16.1	8.6
Level Mean	8.4		6.9		6.9		

TABLE 1-4

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE FOUR,
NUMBER OF RECALLED IDEAS PRESENTED IN AN APPROPRIATE
RELATIONSHIP, FOR THE TREATMENT X LISTENING LEVELS
ANALYSIS OF VARIANCE

School A

Levels							
High			Middle		Low		Treatment Mean
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	8.6	37.3	4.0	11.7	6.0	2.0	6.0
Reading	10.9	3.1	5.6	7.6	7.9	19.8	8.1
Level Mean	9.7		4.8		6.9		

School B

Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	4.4	2.8	2.6	4.0	2.8	7.1	3.3
Reading	6.9	12.7	4.8	12.5	3.6	5.7	5.1
Level Mean	5.6		3.7		3.2		

School C

Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	4.3	4.2	2.6	5.4	3.8	7.9	3.5
Reading	7.3	12.5	5.8	10.8	5.6	15.4	6.2
Level Mean	5.8		4.2		4.7		

TABLE I-5

CELL MEANS AND VARIANCES FOR DEPENDENT
VARIABLE FIVE, NUMBER OF NON-DISTORTED
RECALLED IDEAS, FOR THE TREATMENT X
LISTENING LEVELS ANALYSIS OF VARIANCE

School A

SCHOOL A							
Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	7.1	12.5	4.6	3.0	7.0	2.0	6.2
Reading	11.1	7.5	6.6	6.0	8.7	14.6	8.8
Level Mean	9.1		5.6		7.9		

School B

Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	4.6	3.1	2.6	3.4	2.5	4.3	3.3
Reading	6.3	6.8	4.9	8.1	3.8	5.4	5.0
Level Mean	5.4		3.8		3.1		

School C

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	3.6	5.4	3.5	2.9	3.0	4.0	3.4
Reading	6.4	6.6	3.8	5.9	4.4	7.1	4.8
Level Mean	5.0		3.6		3.7		

TABLE I-6

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE SIX,
PERCENTAGE OF RECALLED IDEAS PRESENTED IN ISOLATION,
FOR THE TREATMENT X LISTENING LEVELS ANALYSIS OF VARIANCE

School A

Levels							
	High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	11.1	220.5	26.7	1260.3	14.5	261.0	17.4
Reading	8.6	235.8	17.1	377.0	10.4	64.4	12.0
Level Mean	9.9		21.9		12.4		

School B

Levels							
High			Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	5.6	110.3	4.2	59.5	19.8	1228.9	9.9
Reading	4.2	138.9	19.8	1347.9	12.9	371.5	12.3
Level Mean	4.9		12.0		16.4		

School C

Levels							
High		Middle		Low		Treatment	
Treatment	Mean	Variance	Mean	Variance	Mean	Variance	Mean
Listening	10.3	99.1	23.9	905.2	22.1	1520.4	18.7
Reading	8.1	154.4	8.0	131.7	11.4	110.5	9.2
Level Mean	9.2		15.9		16.8		

TABLE I-7

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
SEVEN, PERCENTAGE OF RECALLED IDEAS PRESENTED IN
AN INAPPROPRIATE RELATIONSHIP, FOR THE TREATMENT
X LISTENING LEVELS ANALYSIS OF VARIANCE

School A

		Levels						
		High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance		Mean
Listening	5.0	75.0	16.1	368.4	7.3	102.9		9.4
Reading	5.3	33.2	16.9	294.8	17.5	643.4		13.2
Level Mean	5.2		16.5		12.4			

School B

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	19.2	362.3	36.2	1481.2	20.2	680.2	25.2
Reading	7.2	109.7	16.8	359.9	13.2	235.4	12.4
Level Mean	13.2		26.5		16.7		

School C

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	32.8	881.0	38.3	450.6	23.4	193.0	31.5
Reading	22.4	376.2	22.1	672.2	29.5	590.6	24.7
Level Mean	27.6		30.2		26.5		

TABLE I-8

CELL MEANS AND VARIANCES FOR DEPENDENT VARIABLE
EIGHT, PERCENTAGE OF RESPONSE UNITS THAT WERE
IMPORTATIONS FOR THE TREATMENT X LISTENING LEVELS
ANALYSIS OF VARIANCE

School A

		Levels						
		High		Middle		Low		Treatment
Treatment	Mean	Variance	Mean	Variance	Mean	Variance		Mean
Listening	53.7	158.7	46.4	407.6	37.6	161.7		45.9
Reading	26.5	151.0	44.9	343.8	44.0	347.2		38.5
Level Mean	40.1		45.6		40.8			

School B

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	43.2	178.6	42.7	358.2	43.0	277.2	42.9
Reading	31.9	351.9	27.7	407.2	34.3	297.3	31.3
Level Mean	37.5		35.2		38.7		

School C

Treatment	Levels						Treatment Mean
	High		Middle		Low		
	Mean	Variance	Mean	Variance	Mean	Variance	
Listening	49.7	272.6	46.0	372.2	49.0	366.6	48.2
Reading	46.8	121.7	57.5	358.6	51.2	209.9	51.8
Level Mean	48.2		51.7		50.1		

APPENDIX J

TWO-WAY ANALYSIS OF VARIANCE TABLES,
TREATMENT X LISTENING LEVELS

TABLE J-1

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF WORDS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1537	1537	.44	.513
Listening Levels	2	57360	28680	8.14	.001
Interaction	2	2971	1485.5	.42	.659
Error	36	126778	3521.6		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	2763	2763	.68	.413
Listening Levels	2	75836	37918	9.39	.000
Interaction	2	864	432	.11	.898
Error	42	169599	4038.1		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	22147	22147	6.40	.015
Listening Levels	2	4265	2132.5	.616	.545
Interaction	2	7255	3627.5	1.05	.360
Error	42	145401	3461.9		

TABLE J-2

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF RESPONSE UNITS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	27.5	27.5	.59	.446
Listening Levels	2	596.8	298.4	6.44	.004
Interaction	2	69.3	34.7	.75	.480
Error	36	1666.9	46.3		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	14.1	14.1	.37	.544
Listening Levels	2	368.3	184.1	4.88	.012
Interaction	2	66.3	33.1	.88	.423
Error	42	1583.3	37.7		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	481.3	481.3	8.49	.006
Listening Levels	2	15.2	7.6	.13	.875
Interaction	2	60.6	30.3	.54	.590
Error	42	2380.8	56.7		

TABLE J-3

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF RECALLED IDEAS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	57.2	57.2	3.97	.054
Listening Levels	2	128.6	64.3	4.46	.018
Interaction	2	1.8	.9	.06	.940
Error	36	518.9	14.4		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	24.1	24.1	3.63	.064
Listening Levels	2	41.5	20.8	3.13	.054
Interaction	2	4.1	2.0	.30	.739
Error	42	279.0	6.6		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	72.5	72.5	8.61	.005
Listening Levels	2	26.0	13.0	1.55	.225
Interaction	2	11.3	5.6	.67	.517
Error	42	353.6	8.4		

TABLE J-4

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING
LEVELS ON THE DEPENDENT VARIABLE, NUMBER OF RECALLED IDEAS
PRESENTED IN AN APPROPRIATE RELATIONSHIP

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	38.1	38.1	2.80	.103
Listening Levels	2	171	85.5	6.29	.005
Interaction	2	.9	.5	.03	.967
Error	36	489.1	13.6		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	40.3	40.3	5.40	.025
Listening Levels	2	53.0	26.5	3.55	.037
Interaction	2	5.8	2.9	.39	.680
Error	42	313.5	7.5		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	85.3	85.3	9.10	.004
Listening Levels	2	20.4	10.2	1.09	.346
Interaction	2	3.8	1.9	.20	.818
Error	42	393.8	9.4		

TABLE J-5

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING LEVELS
ON THE DEPENDENT VARIABLE, NUMBER OF NON-DISTORTED RECALLED IDEAS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	69.4	69.4	7.65	.009
Listening Levels	2	91.6	45.8	5.05	.012
Interaction	2	10.9	5.4	.60	.555
Error	36	326.6	9.1		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	35.0	35.0	6.76	.013
Listening Levels	2	45.8	22.9	4.42	.018
Interaction	2	2.0	1.0	.20	.822
Error	42	217.6	5.2		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	25.5	25.5	4.80	.034
Listening Levels	2	19.3	9.6	1.82	.175
Interaction	2	12.5	6.3	1.18	.317
Error	42	223.1	5.3		

TABLE J-6

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING
LEVELS ON THE DEPENDENT VARIABLE, PERCENTAGE OF RECALLED
IDEAS PRESENTED IN ISOLATION

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	305.3	305.3	.83	.368
Listening Levels	2	1122.2	561.1	1.53	.231
Interaction	2	99.6	49.8	.14	.874
Error	36	13241.3	367.8		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	71.5	71.5	.13	.719
Listening Levels	2	1072.4	536.2	.99	.380
Interaction	2	11.0	550.5	1.01	.371
Error	42	22799.4	542.8		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1091.3	1091.3	2.24	.142
Listening Levels	2	554.5	277.2	.57	.570
Interaction	2	381.8	190.9	.39	.678
Error	42	20449.6	486.9		

TABLE J-7

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT X LISTENING
LEVELS ON THE DEPENDENT VARIABLE, PERCENTAGE OF RECALLED
PRESENTED IN AN INAPPROPRIATE RELATIONSHIP

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	150.6	150.6	.60	.445
Listening Levels	2	924.0	462.0	1.83	.176
Interaction	2	219.8	109.9	.43	.651
Error	36	9107.0	253.0		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1965.9	1965.9	3.65	.063
Listening Levels	2	1511.9	755.9	1.40	.257
Interaction	2	308.9	154.5	.29	.752
Error	36	22602.2	538.1		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	560.2	560.2	1.06	.309
Listening Levels	2	115.2	57.6	.11	.897
Interaction	2	1062.7	531.4	1.0	.374
Error	36	22144.7	527.3		

TABLE J-8

TWO-WAY ANALYSIS OF VARIANCE TABLES FOR TREATMENT
X LISTENING LEVELS ON THE DEPENDENT VARIABLE,
PERCENTAGE OF RESPONSE UNITS THAT WERE IMPORTATIONS

School A

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	578.2	578.2	2.21	.146
Listening Levels	2	253.5	126.8	.48	.620
Interaction	2	2156.3	1078.1	4.12	.024
Error	36	9419.8	261.7		

School B

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	1621	1621	5.20	.028
Listening Levels	2	100	50	.16	.852
Interaction	2	83.3	41.6	.13	.875
Error	42	13092.7	311.7		

School C

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio	P
Treatment	1	156	156	.55	.462
Listening Levels	2	99.4	49.7	.18	.840
Interaction	2	426.4	213.2	.75	.480
Error	42	11911.7	283.6		